

**THE NATIONAL ALLOWANCE DATA BASE  
VERSION 2.2  
TECHNICAL SUPPORT DOCUMENT  
1998 Revision**

**Prepared for:**

**U.S. Environmental Protection Agency  
Office of Atmospheric Programs  
Acid Rain Division  
Washington, DC 20460**

**Prepared by:**

**Susy S. Rothschild  
E.H. Pechan & Associates, Inc.  
Springfield, VA 22151**

**Pechan Report No. 97.01.002/442.008**

**August 1998**

## **NOTICES**

This document has been reviewed by the Acid Rain Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency, and approved for distribution.

This document is available to the public through the Acid Rain Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency.

## CONTENTS

|  | <u>Page</u> |
|--|-------------|
| Notices .....  | ii          |
| Tables .....   | iv          |
| Abbreviations and Acronyms .....   | v           |
| Acknowledgements .....   | vi          |
| 1. Introduction .....  | 1           |
| 2. National Allowance Data Base .....                                      | 3           |
| 3. Description of Data Elements .....                                      | 7           |
| 4. Supplemental Data File .....  | 35          |
| References .....   | 37          |
| Appendices .....   | A-1         |
| A. EPA Regions .....   | A-1         |
| B. Multi-header Situations .....   | B-1         |
| C. dBASE III Plus NADB Version 2.2 File Structure .....                    | C-1         |
| D. Calculations for TOTHT, SO <sub>2</sub> , and SO <sub>2</sub> RTE ..... | D-1         |
| E. Enforceable SO <sub>2</sub> Emission Limit Determinations .....         | E-1         |
| F. Methodology for Annualization of SO <sub>2</sub> Emission Limits .....  | F-1         |
| G. Technical Documentation for the Supplemental Data File .....            | G-1         |
| 1. Introduction .....  | G-3         |
| 2. Structure of the Supplemental Data File .....                           | G-5         |
| 3. Provision Descriptions .....  | G-9         |
| 4. Examples of SDF Data .....  | G-31        |

## TABLES

| <u>Number</u> |   | <u>Page</u> |
|---------------|---|-------------|
| 1             | NADBV22 Variable List .....   | 19          |
| 2             | Sample NADBV22 Data .....   | 20          |
| 3             | State Summaries for Selected Variables .....                                    | 21          |
| 4             | EPA Region Summaries for Selected Variables .....                               | 22          |
| 5             | Operating Utility Summaries for Selected Variables .....                        | 23          |
| A-1           | EPA Regions -- Grouped by Region .....  | A-1         |
| A-2           | EPA Regions -- Grouped by State .....   | A-2         |
| B-1           | Hypothetical Multi-header Data .....  | B-1         |
| C-1           | dBASE III Plus NADBV22 File Structure .....                                     | C-1         |
| E-1           | Conversion Factors .....  | E-2         |
| E-2           | Averaging Period Codes .....  | E-3         |
| F-1           | SO <sub>2</sub> Emission Averaging Period Codes and Annualization Factors ..... | F-2         |
| G-1           | SDF Fields .....  | G-6         |
| G-2           | SDF File Structure .....  | G-8         |
| G-3           | Sample SDF Data .....   | G-32        |

## ABBREVIATIONS AND ACRONYMS

|                 |   |
|-----------------|---|
| bbl             | -- Barrel   |
| Btu             | -- British thermal unit                               |
| CAA             | -- Clean Air Act                                      |
| CEM             | -- Continuous Emissions Monitoring                    |
| cf              | -- Cubic feet   |
| CFR             | -- <i>Code of Federal Regulations</i>                 |
| DOE             | -- U.S. Department of Energy                          |
| EIA             | -- Energy Information Administration                  |
| EPA             | -- U.S. Environmental Protection Agency               |
| FERC            | -- Federal Energy Regulatory Commission               |
| FGD             | -- Flue gas desulfurization                           |
| FIPS            | -- Federal Information Processing Standard            |
| FR              | -- <i>Federal Register</i>                            |
| GWh             | -- Gigawatt-hour                                      |
| kVA             | -- Kilovolt-ampere                                    |
| kW              | -- Kilowatt   |
| kWh             | -- Kilowatt-hour                                      |
| lbs             | -- Pounds   |
| MMBtu           | -- Million Btu  |
| MMcf            | -- Million cubic feet                                 |
| MW              | -- Megawatt   |
| NADB            | -- National Allowance Data Base                       |
| NADBV211        | -- National Allowance Data Base Version 2.11          |
| NADBV22         | -- National Allowance Data Base Version 2.2           |
| NAPAP           | -- National Acid Precipitation Assessment Program     |
| NERC            | -- North American Electric Reliability Council        |
| NURF            | -- National Utility Reference File                    |
| NSPS            | -- New Source Performance Standards                   |
| OAQPS           | -- Office of Air Quality Planning and Standards (EPA) |
| ORIS            | -- Office of the Regulatory Information System        |
| PC              | -- Personal (micro)computer                           |
| Pechan          | -- E.H. Pechan & Associates, Inc.                     |
| ppm             | -- Parts per million                                  |
| PURPA           | -- Public Utilities Regulatory Policy Act             |
| QF              | -- Qualifying facilities                              |
| RNSPS           | -- Revised New Source Performance Standards           |
| SAS             | -- Statistical Analysis System                        |
| SDF             | -- Supplemental Data File                             |
| SIP             | -- State Implementation Plan                          |
| SO <sub>2</sub> | -- Sulfur dioxide                                     |

## **ACKNOWLEDGEMENTS**

The National Allowance Data Base and its supporting technical documentation were created under the supervision of Dr. Susy S. Rothschild of E.H. Pechan & Associates, Inc. The Supplemental Data File and its supporting technical documentation, presented as Appendix G of this report, were created under the supervision of Adam Kreczko and John Blaney of ICF Incorporated. The author would like to acknowledge the valuable support provided by Debbie Wozniak of E.H. Pechan & Associates, Inc.

## **SECTION 1 INTRODUCTION**

The U.S. Environmental Protection Agency (EPA) began efforts in 1989 to create a data base containing the necessary data elements on utility combustion sources to support a market based system of acid rain controls. The EPA chose the 1985 National Utility Reference File (NURF) data, augmented by the U.S. Department of Energy's (DOE) Energy Information Administration (EIA) data, as the starting point for the development of the National Allowance Data Base (NADB).

The NURF is a comprehensive utility-related data file that was developed in response to the National Acid Precipitation Assessment Program (NAPAP). (NAPAP, through many of the activities of its Emissions and Controls Task Group, has sponsored work both in developing estimates of current emissions from the utility industry and in projecting future emissions.) While the NURF did not meet all conceivable NAPAP needs for data on the utility industry, it provided a framework within which additional data could be conveniently developed.

The NADB differs from the NURF file in the following ways:

- The source of most data elements in the NURF was the NAPAP Emissions Inventory (Version 2), whereas the source of the data in the NADB was most often the EIA.
- In preparing the NADB, the NURF data were extensively reviewed and data inconsistencies were eliminated through contact with State and local air agencies and utilities.
- Data elements needed for calculation of allowances under Title IV of the Clean Air Act (CAA) were expanded in the NADB. Additional data for determining allowances under specific provisions of Title IV are included in the Supplemental Data File (SDF).

The NADB Version 2.11 (NADBV211) data underwent several stages of careful review: by the EPA regions in summer 1990, prior to the release of Version 1.0; by EPA, during fall 1990 and spring 1991, which was followed by the release of Version 2.0 (Pechan, 1991); by the utilities, during a 45-day public review during summer 1991, which resulted in Version 2.1 (Pechan, 1992); and again by the utilities during a 60-day public review during summer 1992,

culminating in the release of Version 2.11 (Pechan, 1993). The NADBV211 was used in 1993 to calculate sulfur dioxide (SO<sub>2</sub>) emissions allowances, as provided by Title IV of the CAA (PL, 1990).

The NADB Version 2.2 (NADBV22) is an update to the NADBV211, necessitated by the CAA Title IV requirement that the SO<sub>2</sub> allowances be reallocated for 1998. The data base structure (number and type of data elements) are identical in both files, as are the number of records.

The new data base, NADBV22, is a result of identification variable changes (such as operating utility name and code, boiler ID, and ORIS plant ID and plant name) as well as changes to a few data elements for a small number of boilers due to EPA errors, court decisions, and litigation settlements.

This document provides a description of how the NADB was developed and what its key data elements are. Those interested primarily in understanding how the data were assembled should read Section 2, which describes the development of the NADB. Specific information about each of the data elements is contained in Section 3. Section 4 includes material pertaining to the SDF. The appendices provide further details.

## SECTION 2 NATIONAL ALLOWANCE DATA BASE

The NADB contains data for utility units, namely "fossil-fuel-fired combustion devices," as defined in §402 of the CAA. **The NADB does not necessarily encompass all affected units, and all units in the NADB are not necessarily affected units.** Delineation of categories of units and their inclusion status in the NADB follows.

- Utility units are included in the data base. These are generally boilers attached to generating turbines (generators) which are owned or operated by an electric utility; this includes existing units (on-line prior to November 15, 1990), new units (on-line after November 15, 1990), and planned units (not on-line as of December 31, 1991).
- Existing, new, and planned combined cycle units are included.
- New and planned simple combustion turbine units are included.
- New cogenerators are not included unless the nameplate capacity is greater than 25 MW and they can potentially sell more than one-third of their generation to a utility.
- New utility units that failed to submit Form EIA-860 by December 31, 1991 are not included.
- Existing simple combustion turbine units (on-line prior to November 15, 1990) are not included.
- Qualifying facilities (QF) under the Public Utilities Regulatory Policy Act (PURPA) are not included.

The origin of the NADB is the 1985 NURF. Data were gathered from the sources listed below:

- The 1985 National Emissions Data System (NEDS) submittals, which serve as the basis for the 1985 NAPAP Emissions Inventory.
- Form EIA-767 (EIA, 1982-1989) and Form FPC-67 (FPC, 1980-1981).
- Form EIA-759 (EIA, 1980-1989).

- The Federal Energy Regulatory Commission (FERC) Form FERC-423 (FERC, 1985-1989).
- The EIA Integrated Data Base System (IDBS), which consists of Form EIA-860 (EIA, 1989a) and Form EIA-861 (EIA, 1989b).

For further information on the NURF, see the NURF documentation (EPA, 1989).

In July 1990, the data for each plant were submitted to the 10 EPA regions for review of the following key elements: 1985 SO<sub>2</sub> emissions and emission rate, 1985 total heat input, and 1985 SO<sub>2</sub> emission limits and associated variables. See Appendix A for a list of the EPA regions and associated States. Responses from the regions and the utilities were compiled and acted upon through October 3, 1990. The result was the NADB Version 1.0, a file with 2,456 generating unit records and 36 variables (data elements). It was disseminated to the public, evoking further responses.

Upon checking the revised data submittals, inconsistencies among specified variables were discerned. In order to verify these values and eliminate inconsistencies whenever possible, sources were contacted and asked to clarify and document these data values. EPA made a concerted effort to revise the data base and incorporate whatever documented information could be obtained. In addition, this version took into consideration the occurrences of multi-header units in which there was not a one-to-one correspondence between boilers and generators. This was addressed by including a data base record for each boiler-generator combination within a plant. See Appendix B for an explanation and example of how data for multi-header units within a plant are handled.

The NADB Version 2.0, produced in June 1991, contained boiler-generator data on fossil-fuel steam generators of all sizes that were reported to be in operation by 1990, or planned to soon be operational, in the 48 contiguous States and the District of Columbia. Also included were reported data for simple combustion turbine and combined cycle units planned for construction through 1995. The file included 3,732 boiler-generator records and 36 fields (variables).

EPA offered The NADB Version 2.0 for public review (FR, 1991) during a 45-day comment period commencing July 19, 1991. After the close of the comment period on September 3, 1991, the Data Change Forms and associated documentation submitted to the EPA docket were reviewed by EPA (and EIA when appropriate). Determinations were made regarding acceptance of suggested changes to the data base. EPA's responses to all the requested changes were submitted to the docket. Changes were made to the data base, resulting in the NADB Version 2.1 (Pechan, 1992). Reported data for simple combustion turbine and combined cycle units planned for construction through 2006 were also included in this data base.

In order to determine which units would qualify for certain special provisions of Title IV, and to calculate allowances for those units, additional information was required beyond that contained in the NADB. EPA prepared a Supplemental Data File (SDF) in 1992 to meet these requirements.

Also, in the course of finalizing the NADB Version 2.1, EIA identified a number of potentially affected units under the Acid Rain Program in their data files that were not included in NADB Version 2.0. These units were generally not owned by traditional utilities but possibly fit the definition of utility unit as

defined in Title IV. EPA created an Adjunct Data File (ADF) containing the same data fields as the NADB for these potentially affected sources.

The NADB Version 2.1 was then subject to a limited public review (FR, 1992) during a 60-day comment period initiated by EPA as of July 7, 1992. Only three items were opened for comment: (1) EPA's policy on outage hours, (2) comments on the SDF, and (3) comments on the ADF. Subsequent to the September 8, 1992 close of the comment period, the documents submitted to the two EPA dockets were reviewed by EPA. (One docket addressed issues raised regarding the NADB Version 2.1, the other docket addressed issues raised in response to the Allowance Allocation Proposed Rule.) Determinations regarding requested data changes on that notice were based on the following policy:

- Changes to outage hour fields were made to conform to the final policy contained in the *Federal Register* notice supporting the NADBV211.
- Necessary changes were made to the SDF in response to comments.
- Units contained in the ADF that, after public comment, EPA believed to be affected units under the Acid Rain program were added to the NADBV211 and documented information added to NADBV211.

In addition, several comments contained requests to change data which was already subject to the review in 1991. EPA made the following decisions regarding such requests:

- If the request was a reiteration of a previous request where EPA correctly resolved the issue, the request was denied.
- If the request was a reiteration of a previous request where EPA failed to correct the error *or* the attempt to correct the error was incorrectly implemented, the request was reviewed and, if appropriate, granted.
- If the request was for a new data change that could have been previously submitted, the request was denied.

This policy fairly implemented the intent of Congress to allow a limited (through December 31, 1991) opportunity to correct data errors, and made sure that requests submitted within the timeframe were handled correctly. For further details, see the Comment Responses available from the EPA docket for public review (EPA, 1993).

Following the completion and implementation of these changes to the data base, the Core Rules (including Acid Rain permitting, allowance trading, and monitoring requirements) were promulgated in January 1993, the Technical Document was updated in February 1993 (Pechan, 1993), and the NADBV211 was released in March 1993 along with the Final SO<sub>2</sub> Allowance Allocation Regulations.

Following the final allowance allocations rule, a number of utilities initiated litigation regarding their allowances and underlying data and a number of other utilities petitioned the Agency for data changes. After litigation regarding the meaning of utility capacity under section 405(c) of the Act was remanded to the Agency, EPA proposed to revise the utility capacity field (UCAPFSST) for three utilities affected by

the provisions. (FR, 1996) In addition, based on the existing policy for reviewing petitions requesting data changes (above), the Agency determined that data changes requested for three units were appropriate. (FR, 1996)

Also, units eligible for allowance allocations under section 405(g)(4) of the Act were required to provide documentation to EPA no later than December 31, 1995 to confirm that the units had commenced construction prior to December 31, 1990 and had commenced commercial operation from January 1, 1993 through December 31, 1995. Based on the submittals, EPA changed the relevant data fields in the SDF and NADBV211. (FR, 1996)

NADB Version 2.2 (NADBV22) incorporated these limited changes to NADBV211 and was released with the Proposed 1998 Reallocation of Allowances on January 7, 1998. (FR, 1998). No changes have been made to NADBV22 since its release. Represented in the NADBV22 are 328 operating utilities, 956 plants, 2,757 generators, and 2,913 boilers. There are 2,468 records of one-to-one boiler-generator correspondence and 1,548 multi-headered records. The NADBV22 includes 3,842 boiler-generator records and 38 fields. The data are sorted by State name, plant name, boiler ID, and generator ID and then assigned a unique sequence number. The NADBV22 is available in dBASE III Plus PC format, as well as on the IBM mainframe in Statistical Analysis System (SAS) format.

## **SECTION 3**

### **DESCRIPTION OF DATA ELEMENTS**

The NADBV22 has the same exact structure as that for the NADBV211: there are 3,842 records and 38 data elements. These data elements are grouped into five categories. The first category -- identification or fixed variables -- includes variables numbered 1 through 11. The second category contains elements numbered 12 and 13, which relate to the calculation of the 1985 actual SO<sub>2</sub> emission rate, and the third category includes data elements numbered 14 through 18, which are associated with the determination of the 1985 allowable SO<sub>2</sub> emission rate. Elements numbered 19 through 34 fall into the fourth category as EIA-supplied data. The fifth and last category includes the variables numbered 35 through 38, which are each calculated from other elements in the data base.

Five tables, at the end of this section, further characterize the data: Table 1 lists and summarizes the variables; Table 2 offers a snapshot of the file with some sample data; and Tables 3, 4, and 5 detail State, regional, and operating utility summaries of selected variables. Because EPA has not updated all operating utility information, the operating utility summaries do not reflect recent utility industry restructuring. The PC version file structure is found in Appendix C.

Descriptions of each of the data elements appear below. Original sources of the data elements are listed when appropriate. However, for a given record, the actual NADBV22 data may have been obtained from a different source as a result of the utility responses submitted during the comment periods or because of a unique plant configuration or reporting method.

#### **IDENTIFICATION OR FIXED VARIABLES**

**1. Boiler-generator Sequence Number (SEQ) --**

The boiler-generator records in this data file, NADBV22, have the unique identifier, SEQ, that has the same value as that in the NADBV211 SEQ. This value was obtained after the NADBV211 data were sorted by State name, plant name, boiler ID, and generator ID, and was assigned a unique sequential number from 1 to 3,842. The NADBV22 is still sorted by SEQ, although some plant names and boiler IDs, among other data elements, were updated.

**2. State Name (STATNAM) --**

This field, from Form EIA-860, contains the name of the State where the plant is located.

**3. Plant Name (PNAME) --**

The name associated with each plant, as reported on Form EIA-860, is contained in this field. PNAMEs for planned units with identical names ("NA") but different plant codes (ORISPL) were modified by appending the ORISPL in order to uniquely identify the plants.

4. **Boiler Identification Code (BLRID) --**

This field identifies the boiler (in the fossil-fuel steam unit case) or gas- or oil-burning turbine (in the new simple combustion turbine case). In the majority of cases, there is a one-to-one correspondence with the generator ID. The source of the boiler identification code was Form EIA-767 or a report from the utility (if there was no Form EIA-767 filled out). If small, planned, or other units did not have an assigned boiler code, a default value of two asterisks followed by the GENID was used.

5. **Generator Identification Code (GENID) --**

This field identifies the electrical generation unit (generator). In the majority of cases, there is a one-to-one correspondence with the boiler identification code. The source of the generator identification code was Form EIA-860.

6. **Operating Utility Name (UTILNAME) --**

The source of the data was Form EIA-861. This name will be different from that in the 1985 NURF if the name or operator changed between 1985 and 1989. For the eight utilities with duplicate names, the State postal code was appended to the utility name to ensure uniqueness.

7. **Operating Utility Code (UCODE) --**

Each operating utility has a unique utility code, originating from Form EIA-861. This field, associated with UTILNAME, also reflects 1989 status.

8. **EPA Region (EPARGN) --**

This field contains the number of the EPA region in which the plant is located. See Appendix A for a complete list of regions and associated states.

9. **County Name (CNTYNAME) --**

The county name was obtained from Form EIA-860. For planned units whose exact location was unknown, the CNTYNAME is "NOT IN FILE."

10. **DOE (ORIS) Plant Code (ORISPL) --**

This plant code was originally developed by ORIS, which is a part of the Federal Power Commission. It is now used as a unique plant identification code assigned by EIA.

11. **Total Phase 1 Allowances (TOTALPH1) --**

This field contains the total basic Phase 1 allowances, in tons, for units that appear in Table A of the CAA (with multi-header situations taken into account). The allowances in Table A, originally on the generator-level, were reallocated to the boiler-level and then adjusted for certain units that receive additional allowances under §404(a)(3) and §404(h) of the CAA. These total values are equal to the sum of Column A and Column B published in Table 1 of §73.10(a) in the *Federal Register* (FR, 1993). Therefore, these total values do not reflect subsequent deductions of allowances required under §416 to create the "auction and sales" allowance reserve that are published in Table 1, Column B.

**1985 ACTUAL SO<sub>2</sub> EMISSION RATE-RELATED VARIABLES**

**12. 1985 Boiler Total Heat Input (TOTHT) --**

Total heat input, in  $10^{12}$  Btu, is the sum of the products of the amount of each fuel consumed and the associated heat content. These data, from the 1985 NURF, reflect 1985 values only. See Appendix D for detailed calculations.

**13. 1985 Boiler SO<sub>2</sub> Emissions (SO2) --**

This field contains SO<sub>2</sub> emissions, in tons, from the 1985 NURF. See Appendix D for detailed calculations.

**1985 ALLOWABLE SO<sub>2</sub> EMISSION RATE (LIMIT)-RELATED VARIABLES**

**14. Boiler SO<sub>2</sub> Regulatory Category (SO2CATEG) --**

The regulatory category determines the type of emission regulation the unit must meet. The plant may be regulated under one of the following:

- The State Implementation Plan (SIP), meaning that State or local regulations are binding (=1);
- The New Source Performance Standards (NSPS), 40 CFR, Part 60, Subpart D (=2);
- The revised NSPS (RNSPS), 40 CFR, Part 60, Subpart Da (=3);
- The NSPS, 40 CFR, Part 60, Subpart GG (=4);
- The SIP for the existing gas turbine, combined cycle with auxiliary firing (=6); or
- The NSPS, 40 CFR, Part 60, Subpart GG for the existing gas turbine, combined cycle, with auxiliary firing (=9).

For units with no information, SO2CATEG=0.

The source of these data was EPA's Office of Air Quality Planning and Standards (OAQPS) preliminary SIP limit data base. These data were updated based on information and documentation provided by utilities, as well as Federal, State, and local regulatory agencies. See Appendix E for further information.

**15. Boiler SO<sub>2</sub> Scrubber Flag (SCRUBBER) --**

This field indicates whether the boiler was scrubbed (=1) or unscrubbed (=0). Scrubber information was obtained from EIA (EIA, 1985) and updated. Information is provided for planned units to the extent available. For planned units for which no information was available, SCRUBBER=9. Units that showed a zero percent SO<sub>2</sub> removal efficiency were assumed to be unscrubbed.

**16. 1985 Boiler SO<sub>2</sub> Emission Limit (FELIM85) --**

This field is the federally enforceable SO<sub>2</sub> emission limit (rounded to four decimal places) that applied to each boiler in 1985, and converted to pounds of SO<sub>2</sub> per million Btu of heat input (lbs/MMBtu), if necessary. For units with more than one limit, the most stringent federally enforceable limit was used. For newer units subject to NSPS, and those that came on-line after 1985, the federally permitted limit was used. For units with no federally enforceable limit or units not yet permitted, a code of 99.9 was used. The source of these data was the OAQPS preliminary SIP limit data base. These data were updated based on information and documentation provided by utilities, as well as Federal, State, and local regulatory agencies. See Appendix E for additional details and conversion factors.

**17. 1985 SO<sub>2</sub> Emission Limit Annualization Factor (ANNFACT) --**

This field is the annualization factor that, when multiplied by the SO<sub>2</sub> emissions limit (FELIM85), produced the annualized SO<sub>2</sub> emission limit (ANNLIM85). See Appendix F for information on methodology.

**18. 1985 SO<sub>2</sub> Emission Limit Averaging Period (AVGPD) --**

This field contains 1 of 17 codes indicating the averaging period or time over which the emission limit, FELIM85, was applied. The source of these data was the OAQPS preliminary SIP limit data base. These data were updated based on information and documentation provided by utilities, as well as Federal, State, and local regulatory agencies. See Appendix E for further information.

## **EIA-SUPPLIED VARIABLES**

**19. 1989 Generator Nameplate Capacity (NAMEPCAP) --**

This field contains the 1989 nameplate capacity of the existing (or planned) generator, in MW and rounded to two decimal places. Form EIA-860 generally was the source of this value. If the nameplate rating was expressed in kilovolt-amperes (kVA), the translation to MW was made by using the formula:

$$MW = kVA * power\ factor / 10^3$$

where kVA and power factor are specified by the manufacturer and stamped on the physical nameplate attached to the generator. For combined cycle units with auxiliary firing, the gas turbine MW and steam generating unit MW were combined for the nameplate capacity value. For planned units, the NAMEPCAP value represents the planned nameplate capacity as reported on Form EIA-860.

20. **1989 Generator Summer Net Dependable Capability (SUMNDCAP) --**

This field contains the 1989 summer net dependable capability of the existing generator, in MW and rounded to two decimal places. The source of this data element was Form EIA-860. For combined cycle units with auxiliary firing, the gas turbine MW and steam generating MW were combined for the summer net dependable capability value. For planned units, the SUMNDCAP value represents the planned summer net dependable capability as reported on Form EIA-860.

Units built to produce both electricity and steam for sale may have more steam (boiler) capability than electric (generator) capability. For the generating units that have significant extra boiler capacity and sell steam, individual multipliers were developed to adjust boiler capability in terms of generator summer capability (kilowatts-electric).

If a value was not available, the default value is NAMEPCAP.

For units coming on-line after 1990, which may not have established a reliable value for summer net dependable capability, the capability was determined from the following formula:

$$SUMNDCAP = NAMEPCAP * factor,$$

where *factor* varies (EIA, 1990a) based on the type of unit as described below:

| <u>Unit Type</u>    | <u>Factor</u> |
|---------------------|---------------|
| Combined Cycle      | .85           |
| Combustion Turbine  | .85           |
| Steam Turbine       | .94           |
| Jet Engine          | .87           |
| Internal Combustion | .97           |

21. **Generator Month On-line (GENMNONL) --**

This data value, from Form EIA-860, is the month portion of the generator startup date. For existing units, this was the first electricity date (viz, the date when the unit began to produce electricity, including electricity generated during a testing period). For units that repowered, it was the repowered generator first electricity date. For planned units, it was the projected first electricity date at the time of NADBV211 development.

22. **Generator Year On-line (GENYRONL) --**

This data value, from Form EIA-860, is the year portion of the generator on-line date. See GENMNONL for further details.

**23. Boiler Month On-line (BLRMNONL) --**

Although the term "commenced commercial operation" is defined as having "begun to generate electricity for sale, including the sale of test generation" (FR, 1993), the generation of electricity occurs at the generator, thus potentially creating difficulty in determining the boiler on-line date that is used to categorize affected units for Phase 2 allowance allocations. Therefore, the following guidelines were compiled with to determine boiler on-line dates:

The boiler on-line month is the month portion of the boiler on-line date.

For units from plants of at least 100 MW and with a generator first electricity on-line date between 1984 and 1989, the boiler on-line date is the generator first positive generation date (viz, the date when both the boiler first consumes fuel and the associated generator first produces generation).

For units with a generator first electricity on-line date prior to 1984 or from plants with less than 100 MW, the boiler on-line date is the generator first electricity date.

For units with on-line dates of 1990 and beyond, the boiler on-line date is the projected generator first electricity date at the time of NADBV211 development.

If the boiler on-line dates are different for multiple boilers that are feeding one generator, the earliest of the boiler on-line dates is used for all the boilers feeding that generator, unless the boiler was new or replaced.

If the boiler is new or was replaced, the date of the boiler's first consumption of fuel, or the date of commercial operation of the new boiler, as reported to EIA, was used. These data have been updated since NADBV211 publication when necessary for correct allocation of allowances.

**24. Boiler Year On-line (BLRYRONL) --**

The boiler on-line year is the year portion of the boiler on-line date. See BLRMNONL for further details.

**25. 1985-1987 Boiler-generator Average Total Heat Input, "Baseline" (BASE8587) --**

The average total heat input (also called "baseline"), in  $10^{12}$  Btu, is the arithmetic mean of the calculated heat inputs for all 1985 through 1987 Form EIA-767 reported fuels. The heat input for each year was calculated in the same way as the 1985 total heat input, as shown in Appendix D.

For steam units with no 1985 Form EIA-767 data (in plants under 100 MW), data were obtained elsewhere. The 1985 fuel use data were apportioned, based on MW, from Form EIA-759 plant-level data. The associated 1985 heat content was determined from the average of the 1986 and 1987 Form EIA-767 heat contents. If no heat content was reported on Form EIA-767 for either 1986 or 1987, the appropriate average State heat content (computed for each fuel reported by all plants in that State on Form EIA-767 from 1985 through 1987) was used as the default value.

For units with OUTAGEHR=26,280 (the entire 1985 to 1987 baseline time period), the value for BASE8587 was an alternative representative baseline value assigned by EPA to correspond to 1 hour of fuel usage, as authorized by §402(4)(a) of the CAA. In this case, the value for OUTAGEHR was correspondingly changed to 26,279 (to avoid division by zero when calculating the adjusted baseline used for the allowance calculations).

For multi-header units, there is a unique value for each boiler-generator, obtained by apportioning the boiler based Form EIA-767 fuel data to each generator, depending upon its fractional share of the total generation (or, if that is not reported, the nameplate capacity) associated with the boiler. When Form EIA-759 plant-level data were used, the data were first apportioned to each generator, depending upon its fractional share of the plant's fossil-fuel nameplate capacity. If there are multiple boilers feeding one generator, the data were divided equally among all the boilers connected to the multi-headered generator.

For combined cycle units with auxiliary firing, all fuel consumed (including fuel from auxiliary boilers, duct heat, or scrubber reheat) was included.

For gas turbines, fuel data were obtained from Form EIA-759 whenever possible. Otherwise, the information was obtained from the utilities.

If there was no fuel consumption for all 3 years, the baseline value is 0.

**Note that outage hours do not affect the numerical value contained in this field.** This baseline value is therefore not adjusted for either outage hours or for units that came on-line during the 1985 to 1987 time period.

**26. Consecutive Planned and Forced Outage Hours (OUTAGEHR) --**

This field represents the number of continuous hours a unit was out of service between 1985 and 1987 due to a planned or forced outage for non-routine maintenance or for specified outage classifications accepted by EPA.

The majority of the data were obtained from the Generating Availability Data System (GADS) (NERC, 1990) that is maintained by the North American Electric Reliability Council (NERC). NERC defines a planned outage as "the removal of a unit from service to perform work on specific components that is scheduled well in advance and has a predetermined duration (e.g., annual overhaul, inspections, testing)." It defines a forced outage as "an unplanned component failure (immediate, delayed, postponed, startup failure) or other condition that requires the unit be removed from service immediately or before the next weekend." For utilities that did not report to GADS, unit outages were allocated if they were well-documented planned or forced outages for non-routine maintenance reported to EIA.

The following list contains the outage classifications that were accepted by EPA.

- ! Forced/planned non-routine maintenance and accidents, longer than or equal to 4 months.
- ! Outages of 3 months or longer caused by accidents (natural phenomena or incidents unrelated to the operation of the unit that are unpreventable, unforeseeable, and not caused by worker error).
- ! Discontinuous but related outages for forced/planned non-routine maintenance, where total duration was 4 months or longer.
- ! Discontinuous but related outages for accidents, where total duration was 3 months or longer.
- ! Outages of 4 months or longer, which were not caused by forced/ planned non-routine maintenance or accidents, in which the unit's emission rate was less than 1.2 lbs/MMBtu and the allowance impact by not providing allowances to the operating utility was severe.

If there were individual unrelated outages each totaling less than 4 months (2,920 hours) during the period from 1985 to 1987, the value of OUTAGEHR is 0.

**27. Primary Fuel Indicator (PRIMFUEL) --**

This field, for those units with fuel use, has a value of 1 if the coal heat input was greater than 50 percent of the total heat input for the years 1985 through 1987, and a value of 2 otherwise (for oil/gas units). For those units which did not report any fuel use on Form EIA-767 for those years (generally, if the steam unit was on standby or out of service, if the unit was part of a plant under 10 MW in size, or if it is not a steam plant), the Form EIA-860 generator primary fuel variable was used to determine the value of PRIMFUEL (the value was set at 1 if the primary fuel was reported as coal, and was set at 2 otherwise).

**28. 1980-1989 Gas Share (GAS8089) --**

This value, calculated from 1980 through 1989 Form EIA-767 data for oil/gas units on-line during the period from 1985 to 1987, is the percentage of gas consumed by each boiler during this time period. The equation used was:

$$GAS8089=100*(1980-1989 \text{ gas heat input})/(1980-1989 \text{ total heat input}).$$

For units in plants under 100 MW which did not report fuel use prior to 1986, Form EIA-767 data from the 1986 to 1989 time period were used. This field was calculated at the boiler level from Form EIA-767 data for boilers in plants that were identified, using Form EIA-759, as consuming more than 75 percent gas between 1980 and 1989. For those boilers in plants not so identified, plant-level data from Form EIA-759 were used. The value is 0 for coal units (those with a greater than 50 percent coal share) on-line during the period from 1985 to 1987.

**29. 1989 Generator Heat Rate (HEATRATE) --**

The generator heat rate value, in Btu/kWh, is the net full load heat rate reported for each generator on Form EIA-860. To ensure that estimated heat rates fell within a reasonable range of 5,000 to 25,000, contacts were made to confirm values that were outside that range. The higher values outside the range were either revised downward or were left alone, since they were reported for very old and inefficient units. A default value for fossil-fuel steam units was used if values of 5,000 or less (mostly in retired or planned units) were reported, or if no data were available. This default value of 10,000 was based on typical heat rates for new fossil-fuel-fired units that range between 7,260 (efficiency of 47 percent) and 13,648 (efficiency of 25 percent) (EIA, 1990b). For planned simple combustion turbine and combined cycle units, heat rate defaults of 13,648 and 8,322, respectively, were used (EIA, 1990b).

**30. 1985 Generator Generation (GENER) --**

Whenever possible, generator generation for 1985, in GWh, was obtained from Form EIA-767. Generator-level generation data were not available for units in plants under 100 MW and for units whose utilities did not report individual generator generation. In these cases, the data were apportioned, by MW, from Form EIA-759 plant-level data. For existing combined cycle units with auxiliary firing, the gas turbine generation and the steam generating unit generation were combined for the generator generation value. For units not operating in 1985, the generation value is 0.

**31. Total Capacity of the Fossil-steam Units of the Operating Utility (UCAPFSST) --**

This field is the sum, in MW, to the nearest integer, of the Form EIA-860 reported 1989 nameplate capacity of all the fossil-fuel steam units operated by the operating utility of the particular unit in 1989. In a few cases, this value is 0 because all of the utility's units retired before 1989 or had not come on-line by 1989. In addition, if the operated capacity was less than 0.5 MW, this field value is 0. As a result of litigation, three utilities had this data element modified.

**32. Maximum of the Average Heat Inputs for Any Combination of Three Consecutive Years from 1980-1989 (MXBS8089) --**

This heat input data element (also called "maximum baseline"), in  $10^{12}$  Btu, is the maximum of the average heat inputs for every combination of 3 consecutive years reported on Form EIA-767 between 1980 and 1989. It was calculated similarly to BASE8587, but only for units subject to §405(i) of Title IV of the CAA; the value is 0 otherwise.

**33. Representative Year SO<sub>2</sub> Emission Rate (RY\_ER) --**

The representative year SO<sub>2</sub> emission rate, in lbs/MMBtu and rounded to four decimal places, is nonzero only for those cases in which there is a positive baseline (either BASE8587 or MXBS8089) value, but no 1985 emission rate.

This field was assigned the 1985 (or 1986 or 1987) SO<sub>2</sub> emission rate calculated from EIA data. The EIA emission rate was calculated using Form EIA-767 fuel quantity and quality data, EPA's AP-42 emission factors (EPA, 1985), and the SO<sub>2</sub> control efficiency. See Appendix D for the formula.

If a unit had a positive baseline value, an SO<sub>2</sub>RTE value of 0, all EIA emission rates calculated to be 0, and was more than 90 percent gas for either the 1980 to 1989 (GAS8089>90) or the 1985 time period, then this field was assigned a default value of 0.0006, based on the AP-42 factor for natural gas. During the comment period, a utility may have requested use of an alternate year's rate; if such a rate was necessary for allowance calculations and was approved, it was included.

**34. Municipally Operated Flag (FLAGMUNI) --**

If an operating utility is a municipal utility as of December 1989, this field has a value of 1, and 0 otherwise. The source of this data element was Form EIA-861.

**CALCULATED VARIABLES**

**35. 1985 Boiler SO<sub>2</sub> Emission Rate (SO<sub>2</sub>RTE) --**

The actual SO<sub>2</sub> emission rate, in lbs/MMBtu and rounded to four decimal places, was calculated from the boiler SO<sub>2</sub> emissions (tons) in 1985 and the boiler total heat input of fuels burned ( $10^{12}$  Btu) in 1985. See Appendix D for detailed calculations. The equation used was:

$$SO_2RTE = (2 * SO_2) / (1000 * TOTHT).$$

**36. 1985 Annualized Boiler SO<sub>2</sub> Emission Limit (ANNLIM85) --**

The "allowable 1985 SO<sub>2</sub> emission rate," in lbs/MMBtu and rounded to four decimal places, is defined in the CAA as an annual equivalent SO<sub>2</sub> emission limit. ANNLIM85 was calculated using the equation:

$$ANNLIM85 = ANNFACT * FELIM85.$$

**37. Generator Heat Input at 60 Percent Capacity (HT60) --**

This field, in  $10^{12}$  Btu, was calculated on an annual basis using the formula as shown, where 5,256 is a conversion factor (60 percent of 8,760 hrs/yr):

$$HT60 = (HEATRATE * SUMNDCAP * 5256) / 10^9.$$

The net summer capability was used because the nameplate capacity for many units was not a good measure of the maximum MW a generator can produce. Most utility planners use a measure of dependable capacity such as net dependable summer capability.

**38. Boiler-generator Share of Generator Heat Input at 60 Percent Capacity (HT60SHR) --**

This field, in  $10^{12}$  Btu, was calculated from HT60 for multi-header units. For each generator with multiple boilers, based on BASE8587, HT60 was apportioned among the boilers. If the BASE8587 value for the multiple boilers are all 0, HT60 was shared equally among the boilers. If there is a single boiler associated with a generator, HT60SHR is equal to HT60.

**Table 1**  
**NADBV22 Variable List**

| <b>Field Number</b> | <b>Variable Name</b> | <b>Description</b>  |
|---------------------|----------------------|---|
| 1                   | SEQ                  | Boiler-generator sequence number (same as in NADBV211)  |
| 2                   | STATNAM              | State name  |
| 3                   | PNAME                | Plant name  |
| 4                   | BLRID                | Boiler identification code  |
| 5                   | GENID                | Generator identification code   |
| 6                   | UTILNAME             | Operating utility name  |
| 7                   | UCODE                | Operating utility code  |
| 8                   | EPARGN               | EPA region  |
| 9                   | CNTYNAME             | County name   |
| 10                  | ORISPL               | DOE ORIS plant code   |
| 11                  | TOTALPH1             | Total basic Phase 1 allowances (tons)   |
| 12                  | TOTHT                | 1985 boiler total heat input ( $10^{12}$ Btu) from NURF   |
| 13                  | SO2                  | 1985 boiler SO <sub>2</sub> emissions (tons) from NURF  |
| 14                  | SO2CATEG             | Boiler SO <sub>2</sub> regulatory category (0=no information, 1=SIP, 2=NSPS D, 3=NSPS Da, 4=NSPS GG, 6=SIP for existing gas turbine, combined cycle, with auxiliary firing, 9=NSPS GG for existing gas turbine, combined cycle with auxiliary firing) |
| 15                  | SCRUBBER             | Boiler SO <sub>2</sub> scrubber flag (1=yes, 0=no, 9=no information)  |
| 16                  | FELIM85              | 1985 boiler SO <sub>2</sub> emission limit (lbs/MMBtu)  |
| 17                  | ANNFACT              | 1985 SO <sub>2</sub> emission limit annualization factor  |
| 18                  | AVGPD                | 1985 SO <sub>2</sub> emission limit averaging period  |
| 19                  | NAMEPCAP             | 1989 existing and planned generator nameplate capacity (MW)   |
| 20                  | SUMNDCAP             | 1989 generator summer net dependable capability (MW)  |
| 21                  | GENMNONL             | Generator month on-line   |
| 22                  | GENYRONL             | Generator year on-line  |
| 23                  | BLRMNONL             | Boiler month on-line  |
| 24                  | BLRYRONL             | Boiler year on-line   |
| 25                  | BASE8587             | 1985-1987 boiler-generator average total heat input, "baseline" ( $10^{12}$ Btu)  |
| 26                  | OUTAGEHR             | Consecutive planned and forced outage time during 1985-1987 $\geq$ 2,920 hours (hours)  |
| 27                  | PRIMFUEL             | Primary fuel indicator based on greatest fuel heat share during 1985-1987 (1=coal>50%, 2=oil/gas)   |
| 28                  | GAS8089              | 1980-1989 gas share (%)   |
| 29                  | HEATRATE             | 1989 generator full load heat rate (Btu/kWh)  |
| 30                  | GENER                | 1985 generator generation (GWh)   |
| 31                  | UCAPFSST             | Total capacity of the fossil-steam units of the operating utility (MW)  |
| 32                  | MXBS8089             | Maximum of the average heat inputs for any combination of three consecutive years from 1980-1989 for selected units ( $10^{12}$ Btu)  |
| 33                  | RY_ER                | Representative year SO <sub>2</sub> emission rate (lbs/MMBtu)   |
| 34                  | FLAGMUNI             | Municipally operated flag (1=yes, 0=no)   |
| 35                  | SO2RTE               | 1985 boiler SO <sub>2</sub> emission rate (lbs/MMBtu)   |
| 36                  | ANNLIM85             | 1985 annualized boiler SO <sub>2</sub> emission limit (lbs/MMBtu)   |
| 37                  | HT60                 | Generator heat input at 60 percent capacity ( $10^{12}$ Btu)  |
| 38                  | HT60SHR              | Boiler-generator share of generator heat input at 60 percent capacity ( $10^{12}$ Btu)  |

**Table 2**  
**Sample NADBV22 Data**

| SEQ  | STATNAM | PNAME      | BLRID | GENID | UTILNAME                     | UCODE | EPARGN |
|------|---------|------------|-------|-------|------------------------------|-------|--------|
| 1281 | KANSAS  | QUINDARO   | 2     | ST2   | KANSAS CITY CITY OF          | 9996  | 7      |
| 1282 | KANSAS  | RIPLEY     | **1   | 1     | KANSAS GAS & ELECTRIC CO.    | 10005 | 7      |
| 1283 | KANSAS  | RIPLEY     | **2   | 2     | KANSAS GAS & ELECTRIC CO.    | 10005 | 7      |
| 1284 | KANSAS  | RIPLEY     | **3   | 3     | KANSAS GAS & ELECTRIC CO.    | 10005 | 7      |
| 1285 | KANSAS  | RIVERTON   | LP    | 3     | EMPIRE DISTRICT ELECTRIC CO. | 5860  | 7      |
| 1286 | KANSAS  | RIVERTON   | LP    | 4     | EMPIRE DISTRICT ELECTRIC CO. | 5860  | 7      |
| 1287 | KANSAS  | RIVERTON   | 39    | 7     | EMPIRE DISTRICT ELECTRIC CO. | 5860  | 7      |
| 1288 | KANSAS  | RIVERTON   | 40    | 8     | EMPIRE DISTRICT ELECTRIC CO. | 5860  | 7      |
| 1289 | KANSAS  | RIVERTON   | 41    | 6     | EMPIRE DISTRICT ELECTRIC CO. | 5860  | 7      |
| 1290 | KANSAS  | ROSS BEACH | 1     | 1     | MIDWEST ENERGY INC.          | 12524 | 7      |

| SEQ  | CNTYNAME  | ORISPL | TOTALPH1 | TOTHT    | SO2     | SO2CATEG | SCRUBBER | FELIM85 | ANNFACT | AVGPD |
|------|-----------|--------|----------|----------|---------|----------|----------|---------|---------|-------|
| 1281 | WYANDOTTE | 1295   | 4220     | 1.523439 | 3254.71 | 1        | 0        | 3.0000  | 0.89    | 3     |
| 1282 | SEDGWICK  | 1244   | 0        | 0.002388 | 0.00    | 1        | 0        | 3.0000  | 1.00    | 0     |
| 1283 | SEDGWICK  | 1244   | 0        | 0.003250 | 0.00    | 1        | 0        | 3.0000  | 1.00    | 0     |
| 1284 | SEDGWICK  | 1244   | 0        | 0.003426 | 0.00    | 1        | 0        | 3.0000  | 1.00    | 0     |
| 1285 | CHEROKEE  | 1239   | 0        | 0.001118 | 0.00    | 1        | 0        | 3.0000  | 1.00    | 0     |
| 1286 | CHEROKEE  | 1239   | 0        | 0.001118 | 0.00    | 1        | 0        | 3.0000  | 1.00    | 0     |
| 1287 | CHEROKEE  | 1239   | 0        | 2.187371 | 4877.00 | 1        | 0        | 3.0000  | 0.89    | 3     |
| 1288 | CHEROKEE  | 1239   | 0        | 3.603229 | 8035.00 | 1        | 0        | 3.0000  | 0.89    | 3     |
| 1289 | CHEROKEE  | 1239   | 0        | 0.082823 | 0.00    | 1        | 0        | 3.0000  | 1.00    | 0     |
| 1290 | GRAHAM    | 1228   | 0        | 0.002100 | 0.00    | 1        | 0        | 99.9000 | 1.00    | 0     |

| SEQ  | NAMEPCAP | SUMNDCAP | GENMNONL | GENYRONL | BLRMNONL | BLRYRONL | BASE8587 | OUTAGEHR | PRIMFUEL | GAS8089 | HEATRATE |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------|----------|
| 1281 | 157.50   | 135.00   | 11       | 1971     | 11       | 1971     | 3.381038 | 3833     | 1        | 0.000   | 9500.00  |
| 1282 | 23.00    | 26.90    | 7        | 1938     | 7        | 1938     | 0.000796 | 0        | 2        | 81.170  | 10000.00 |
| 1283 | 31.30    | 30.40    | 9        | 1948     | 9        | 1948     | 0.001083 | 0        | 2        | 81.170  | 10000.00 |
| 1284 | 33.00    | 34.50    | 8        | 1949     | 8        | 1949     | 0.001142 | 0        | 2        | 81.170  | 58267.00 |
| 1285 | 10.00    | 11.00    | 5        | 1923     | 5        | 1923     | 0.000241 | 0        | 2        | 3.610   | 30000.00 |
| 1286 | 12.50    | 9.00     | 5        | 1941     | 5        | 1923     | 0.000302 | 0        | 2        | 3.610   | 30500.00 |
| 1287 | 37.50    | 38.10    | 5        | 1950     | 5        | 1950     | 1.978993 | 0        | 1        | 0.000   | 12500.00 |
| 1288 | 50.00    | 53.20    | 5        | 1954     | 5        | 1954     | 3.358551 | 0        | 1        | 0.000   | 12700.00 |
| 1289 | 25.00    | 31.50    | 5        | 1939     | 5        | 1939     | 0.045559 | 0        | 2        | 3.610   | 19000.00 |
| 1290 | 11.50    | 12.00    | 0        | 1954     | 0        | 1954     | 0.001847 | 0        | 2        | 94.080  | 12500.00 |

| SEQ  | GENER  | UCAPFSST | MXBS8089 | RY_ER  | FLAGMUNI | SO2RTE | ANNLIM85 | HT60      | HT60SHR   |
|------|--------|----------|----------|--------|----------|--------|----------|-----------|-----------|
| 1281 | 128.96 | 661.00   | 0.000000 | 0.0000 | 1        | 4.2728 | 2.6700   | 6.740820  | 6.740820  |
| 1282 | 0.00   | 961.00   | 0.000000 | 0.0006 | 0        | 0.0000 | 3.0000   | 1.413864  | 1.413864  |
| 1283 | 0.00   | 961.00   | 0.000000 | 0.0000 | 0        | 0.0000 | 3.0000   | 1.597824  | 1.597824  |
| 1284 | 0.00   | 961.00   | 0.000000 | 0.0000 | 0        | 0.0000 | 3.0000   | 10.565672 | 10.565672 |
| 1285 | 0.00   | 344.00   | 0.000000 | 0.0000 | 0        | 0.0000 | 3.0000   | 1.734480  | 1.734480  |
| 1286 | 0.00   | 344.00   | 0.000000 | 0.0000 | 0        | 0.0000 | 3.0000   | 1.442772  | 1.442772  |
| 1287 | 177.81 | 344.00   | 0.000000 | 0.0000 | 0        | 4.4592 | 2.6700   | 2.503170  | 2.503170  |
| 1288 | 286.59 | 344.00   | 0.000000 | 0.0000 | 0        | 4.4599 | 2.6700   | 3.551164  | 3.551164  |
| 1289 | 3.41   | 344.00   | 0.000000 | 0.0000 | 0        | 0.0000 | 3.0000   | 3.145716  | 3.145716  |
| 1290 | 0.04   | 62.00    | 0.000000 | 0.0006 | 0        | 0.0000 | 99.9000  | 0.788400  | 0.788400  |

**Table 3**  
**State Summaries for Selected Variables**

| <b>St.</b> | <b>Num.<br/>Blr.</b> | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>Num.<br/>Gen.</b> | <b>NAMEPCAP<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|------------|----------------------|-------------------------------|-----------------------|--|------------------------|----------------------|--------------------------|----------------------|---|
| AL         | 51                   | 2.04                          | 534,467.6             | 523.3                                  | 51,445.0               | 51                   | 13,404.5                 | 53                   | 517.3                                     |
| AR         | 22                   | 0.66                          | 72,860.4              | 222.4                                  | 21,231.8               | 22                   | 6,609.1                  | 22                   | 233.6                                     |
| AZ         | 47                   | 0.68                          | 112,376.4             | 330.1                                  | 31,583.1               | 45                   | 8,498.1                  | 47                   | 292.8                                     |
| CA         | 151                  | 0.01                          | 4,425.1               | 685.3                                  | 66,286.7               | 126                  | 22,558.2                 | 202                  | 598.2                                     |
| CO         | 57                   | 0.58                          | 82,110.4              | 285.5                                  | 26,393.9               | 59                   | 6,068.2                  | 104                  | 285.2                                     |
| CT         | 28                   | 0.95                          | 60,339.0              | 127.7                                  | 12,368.5               | 25                   | 3,382.2                  | 37                   | 129.3                                     |
| DC         | 2                    | 1.10                          | 820.3                 | 1.5                                    | 90.0                   | 2                    | 580.0                    | 2                    | 2.5                                       |
| DE         | 16                   | 1.35                          | 68,334.0              | 101.3                                  | 8,102.7                | 16                   | 1,914.9                  | 22                   | 103.6                                     |
| FL         | 167                  | 1.43                          | 531,260.1             | 743.1                                  | 72,600.0               | 164                  | 30,572.7                 | 182                  | 848.4                                     |
| GA         | 50                   | 2.95                          | 998,292.0             | 677.6                                  | 68,989.2               | 49                   | 13,534.3                 | 50                   | 668.3                                     |
| IA         | 73                   | 1.75                          | 197,527.5             | 226.1                                  | 20,308.8               | 74                   | 6,760.9                  | 110                  | 230.2                                     |
| ID         | 0                    | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0                    | 0.0                      | 0                    | 0.0                                       |
| IL         | 114                  | 3.11                          | 1,044,936.9           | 672.7                                  | 74,006.4               | 98                   | 21,439.1                 | 207                  | 673.0                                     |
| IN         | 115                  | 3.62                          | 1,496,251.0           | 826.2                                  | 79,006.9               | 98                   | 22,910.9                 | 153                  | 829.8                                     |
| KS         | 88                   | 0.99                          | 133,480.3             | 269.5                                  | 23,341.1               | 96                   | 8,010.5                  | 115                  | 267.0                                     |
| KY         | 72                   | 2.49                          | 783,331.7             | 629.8                                  | 60,127.6               | 69                   | 17,821.0                 | 75                   | 654.9                                     |
| LA         | 91                   | 0.34                          | 79,232.9              | 473.6                                  | 41,573.3               | 90                   | 15,823.8                 | 139                  | 433.9                                     |
| MA         | 45                   | 1.67                          | 245,541.1             | 294.1                                  | 28,664.3               | 40                   | 6,282.9                  | 68                   | 308.2                                     |
| MD         | 52                   | 2.06                          | 215,678.4             | 209.6                                  | 20,622.6               | 49                   | 9,519.7                  | 57                   | 231.3                                     |
| ME         | 16                   | 0.95                          | 10,261.7              | 21.6                                   | 2,060.7                | 14                   | 1,069.0                  | 16                   | 25.3                                      |
| MI         | 118                  | 1.32                          | 408,838.7             | 620.2                                  | 60,856.6               | 109                  | 16,346.1                 | 204                  | 662.8                                     |
| MN         | 77                   | 1.07                          | 111,135.3             | 207.0                                  | 18,990.6               | 80                   | 6,628.8                  | 125                  | 208.7                                     |
| MO         | 85                   | 4.02                          | 961,359.7             | 478.8                                  | 45,895.9               | 81                   | 14,028.9                 | 109                  | 479.4                                     |
| MS         | 43                   | 1.31                          | 102,033.3             | 156.2                                  | 14,710.0               | 42                   | 5,804.6                  | 57                   | 156.8                                     |
| MT         | 9                    | 0.35                          | 16,152.1              | 93.1                                   | 8,524.9                | 9                    | 2,589.8                  | 9                    | 121.4                                     |
| NC         | 51                   | 1.40                          | 343,326.6             | 490.7                                  | 63,362.3               | 47                   | 12,556.3                 | 51                   | 482.3                                     |
| ND         | 24                   | 1.26                          | 144,763.0             | 230.1                                  | 21,715.4               | 21                   | 4,536.0                  | 27                   | 232.0                                     |
| NE         | 36                   | 0.87                          | 47,915.2              | 110.8                                  | 10,282.2               | 37                   | 3,919.9                  | 46                   | 109.6                                     |
| NH         | 8                    | 2.80                          | 75,853.0              | 54.3                                   | 5,074.1                | 7                    | 1,048.2                  | 8                    | 54.3                                      |
| NJ         | 61                   | 1.08                          | 101,783.7             | 189.2                                  | 20,244.4               | 54                   | 7,737.9                  | 70                   | 177.5                                     |
| NM         | 47                   | 0.50                          | 73,778.7              | 294.9                                  | 27,221.4               | 48                   | 5,750.8                  | 56                   | 284.2                                     |
| NV         | 27                   | 0.59                          | 40,584.6              | 138.8                                  | 12,465.1               | 27                   | 4,986.4                  | 27                   | 165.0                                     |
| NY         | 124                  | 1.22                          | 413,061.3             | 678.7                                  | 62,345.8               | 104                  | 18,617.7                 | 182                  | 687.8                                     |
| OH         | 171                  | 4.02                          | 2,217,423.1           | 1,103.2                                | 109,888.6              | 165                  | 27,155.2                 | 266                  | 1,140.0                                   |
| OK         | 51                   | 0.44                          | 90,925.1              | 417.5                                  | 40,787.0               | 49                   | 12,852.8                 | 53                   | 408.4                                     |
| OR         | 1                    | 0.80                          | 2,777.1               | 6.9                                    | 641.2                  | 1                    | 560.5                    | 1                    | 2.3                                       |
| PA         | 92                   | 2.12                          | 1,173,882.9           | 1,106.1                                | 109,332.9              | 83                   | 23,859.6                 | 124                  | 1,102.8                                   |
| RI         | 5                    | 0.69                          | 2,343.0               | 6.8                                    | 580.5                  | 6                    | 242.9                    | 9                    | 8.5                                       |
| SC         | 35                   | 1.57                          | 155,863.4             | 198.5                                  | 19,929.5               | 35                   | 6,838.2                  | 35                   | 208.7                                     |
| SD         | 13                   | 2.25                          | 33,699.3              | 29.9                                   | 2,523.0                | 13                   | 882.0                    | 21                   | 22.2                                      |
| TN         | 37                   | 3.26                          | 802,030.0             | 492.9                                  | 50,345.8               | 37                   | 10,020.4                 | 37                   | 497.7                                     |
| TX         | 295                  | 0.49                          | 559,165.0             | 2,266.5                                | 213,577.7              | 286                  | 67,584.5                 | 328                  | 2,234.2                                   |
| UT         | 19                   | 0.32                          | 23,290.0              | 148.0                                  | 13,483.7               | 22                   | 5,354.1                  | 26                   | 188.0                                     |
| VA         | 34                   | 1.35                          | 131,224.5             | 194.1                                  | 19,062.6               | 33                   | 7,457.8                  | 34                   | 217.1                                     |
| VT         | 5                    | 0.25                          | 1,212.1               | 9.8                                    | 326.5                  | 5                    | 84.0                     | 5                    | 2.6                                       |
| WA         | 22                   | 1.67                          | 68,772.9              | 82.2                                   | 8,171.5                | 10                   | 1,678.2                  | 53                   | 78.9                                      |
| WI         | 114                  | 2.41                          | 379,745.0             | 315.1                                  | 29,620.6               | 107                  | 10,129.2                 | 166                  | 329.9                                     |
| WV         | 33                   | 2.48                          | 951,464.5             | 766.9                                  | 79,302.1               | 33                   | 14,958.3                 | 33                   | 763.1                                     |
| WY         | 19                   | 0.74                          | 137,424.0             | 370.7                                  | 34,590.6               | 19                   | 5,894.7                  | 19                   | 352.8                                     |
| <b>US</b>  | <b>2,913</b>         | <b>1.75</b>                   | <b>16,243,354.1</b>   | <b>18,578.8</b>                        | <b>1,812,655.3</b>     | <b>2,757</b>         | <b>516,864.3</b>         | <b>3,842</b>         | <b>18,711.5</b>                           |

**Table 4**  
**EPA Region Summaries for Selected Variables**

| <b>EPA<br/>Rgn</b> | <b>Num.<br/>Blr.</b> | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>Num.<br/>Gen.</b> | <b>NAMEPCAP<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------|----------------------|-------------------------------|-----------------------|--|------------------------|----------------------|--------------------------|----------------------|---|
| 1                  | 107                  | 1.54                          | 395,549.9             | 514.4                                  | 49,074.6               | 97                   | 12,109.3                 | 143                  | 528.3                                     |
| 2                  | 185                  | 1.19                          | 514,845.0             | 867.9                                  | 82,590.2               | 158                  | 26,355.6                 | 252                  | 865.4                                     |
| 3                  | 229                  | 2.14                          | 2,541,404.6           | 2,379.4                                | 236,513.0              | 216                  | 58,290.3                 | 272                  | 2,420.2                                   |
| 4                  | 506                  | 2.17                          | 4,250,604.8           | 3,912.0                                | 401,509.3              | 494                  | 110,552.0                | 540                  | 4,034.3                                   |
| 5                  | 709                  | 3.02                          | 5,658,330.1           | 3,744.4                                | 372,369.7              | 657                  | 104,609.4                | 1,121                | 3,844.2                                   |
| 6                  | 506                  | 0.48                          | 875,962.0             | 3,675.0                                | 344,391.3              | 495                  | 108,621.1                | 598                  | 3,594.5                                   |
| 7                  | 282                  | 2.47                          | 1,340,282.8           | 1,085.2                                | 99,828.1               | 288                  | 32,720.2                 | 380                  | 1,086.2                                   |
| 8                  | 141                  | 0.76                          | 437,438.7             | 1,157.3                                | 107,231.4              | 143                  | 25,324.8                 | 206                  | 1,201.5                                   |
| 9                  | 225                  | 0.27                          | 157,386.2             | 1,154.3                                | 110,334.9              | 198                  | 36,042.8                 | 276                  | 1,055.9                                   |
| 10                 | 23                   | 1.61                          | 71,550.1              | 89.1                                   | 8,812.7                | 11                   | 2,238.7                  | 54                   | 81.2                                      |
| <b>US</b>          | <b>2,913</b>         | <b>1.75</b>                   | <b>16,243,354.1</b>   | <b>18,578.8</b>                        | <b>1,812,655.3</b>     | <b>2,757</b>         | <b>516,864.3</b>         | <b>3,842</b>         | <b>18,711.5</b>                           |

**Table 5**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| ALABAMA ELECTRIC COOP INC      | 1.13                          | 14,205.0              | 25.0                                   | 2,341.0                | 572.0                     | 15                   | 26.0                                      |
| ALABAMA POWER CO               | 1.93                          | 354,319.0             | 367.0                                  | 36,362.0               | 8,775.0                   | 25                   | 352.0                                     |
| ALEXANDRIA CITY OF             | 0.00                          | 1.0                   | 2.0                                    | 142.0                  | 175.0                     | 4                    | 2.0                                       |
| ALLIANCE CITY OF               | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 8.0                       | 1                    | 0.0                                       |
| AMERICAN MUN POWER-OHIO INC    | 4.43                          | 22,283.0              | 10.0                                   | 0.0                    | 200.0                     | 8                    | 10.0                                      |
| AMES CITY OF                   | 1.25                          | 1,458.0               | 2.0                                    | 217.0                  | 98.0                      | 3                    | 3.0                                       |
| APPALACHIAN POWER CO           | 1.13                          | 163,634.0             | 290.0                                  | 30,865.0               | 5,722.0                   | 12                   | 275.0                                     |
| ARIZONA ELECTRIC PWR COOP INC  | 0.66                          | 5,599.0               | 17.0                                   | 1,581.0                | 464.0                     | 3                    | 13.0                                      |
| ARIZONA PUBLIC SERVICE CO      | 0.51                          | 47,605.0              | 185.0                                  | 17,567.0               | 4,059.0                   | 22                   | 194.0                                     |
| ARKANSAS ELECTRIC COOP CORP    | 0.00                          | 0.0                   | 0.0                                    | 23.0                   | 315.0                     | 4                    | 0.0                                       |
| ARKANSAS POWER & LIGHT CO      | 0.61                          | 58,375.0              | 192.0                                  | 18,388.0               | 5,636.0                   | 18                   | 205.0                                     |
| ASSOCIATED ELECTRIC COOP INC   | 4.73                          | 258,941.0             | 109.0                                  | 10,654.0               | 2,335.0                   | 5                    | 105.0                                     |
| ATLANTIC CITY ELECTRIC CO      | 2.49                          | 43,151.0              | 35.0                                   | 2,856.0                | 784.0                     | 11                   | 36.0                                      |
| ATLANTIC CITY OF               | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 5.0                       | 2                    | 0.0                                       |
| AUSTIN CITY OF (MN)            | 2.68                          | 1,078.0               | 1.0                                    | 60.0                   | 32.0                      | 5                    | 1.0                                       |
| AUSTIN CITY OF (TX)            | 0.00                          | 7.0                   | 24.0                                   | 2,184.0                | 1,534.0                   | 11                   | 22.0                                      |
| BALTIMORE GAS & ELECTRIC CO    | 1.54                          | 49,584.0              | 64.0                                   | 6,263.0                | 2,693.0                   | 20                   | 77.0                                      |
| BANGOR HYDRO-ELECTRIC CO       | 2.28                          | 603.0                 | 1.0                                    | 39.0                   | 57.0                      | 3                    | 1.0                                       |
| BASIN ELECTRIC POWER COOP      | 0.64                          | 52,886.0              | 166.0                                  | 15,541.0               | 3,286.0                   | 9                    | 180.0                                     |
| BIG RIVERS ELECTRIC CORP       | 2.26                          | 126,000.0             | 111.0                                  | 10,418.0               | 2,004.0                   | 9                    | 108.0                                     |
| BLACK HILLS CORP               | 1.01                          | 4,723.0               | 9.0                                    | 604.0                  | 115.0                     | 16                   | 9.0                                       |
| BLUE EARTH CITY OF             | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| BOSTON EDISON CO               | 0.82                          | 30,634.0              | 75.0                                   | 7,280.0                | 1,804.0                   | 6                    | 84.0                                      |
| BRAZOS ELECTRIC POWER COOP INC | 0.00                          | 3.0                   | 18.0                                   | 1,671.0                | 437.0                     | 12                   | 16.0                                      |
| BREESE CITY OF                 | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 2.0                       | 2                    | 0.0                                       |
| BROWNSVILLE PUBLIC UTILS BOARD | 0.00                          | 0.0                   | 0.0                                    | 16.0                   | 47.0                      | 2                    | 1.0                                       |
| BRYAN CITY OF                  | 0.02                          | 39.0                  | 4.0                                    | 314.0                  | 221.0                     | 5                    | 4.0                                       |
| BURBANK CITY OF                | 0.01                          | 7.0                   | 2.0                                    | 150.0                  | 167.0                     | 4                    | 3.0                                       |
| BURLINGTON CITY OF             | 0.25                          | 1,212.0               | 10.0                                   | 327.0                  | 50.0                      | 4                    | 3.0                                       |
| CAJUN ELECTRIC POWER COOP INC  | 0.94                          | 41,465.0              | 89.0                                   | 7,290.0                | 1,909.0                   | 5                    | 70.0                                      |
| CAMBRIDGE ELECTRIC LIGHT CO    | 0.24                          | 459.0                 | 4.0                                    | 177.0                  | 86.0                      | 21                   | 4.0                                       |
| CANAL ELECTRIC CO              | 2.35                          | 69,049.0              | 59.0                                   | 5,923.0                | 1,072.0                   | 2                    | 58.0                                      |
| CARDINAL OPERATING COMPANY     | 3.79                          | 159,563.0             | 84.0                                   | 8,752.0                | 1,880.0                   | 3                    | 90.0                                      |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| CARLYLE CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| CAROLINA POWER & LIGHT CO      | 1.32                          | 162,756.0             | 246.0                                  | 36,888.0               | 5,545.0                   | 24                   | 241.0                                     |
| CEDAR FALLS CITY OF            | 3.66                          | 129.0                 | 0.0                                    | 5.0                    | 52.0                      | 2                    | 0.0                                       |
| CENTEL CORP                    | 0.38                          | 1,486.0               | 8.0                                    | 528.0                  | 356.0                     | 9                    | 7.0                                       |
| CENTRAL ELECTRIC POWER COOP    | 5.93                          | 8,373.0               | 3.0                                    | 281.0                  | 59.0                      | 2                    | 2.0                                       |
| CENTRAL HUDSON GAS & ELEC CORP | 1.47                          | 52,498.0              | 71.0                                   | 7,070.0                | 1,774.0                   | 6                    | 72.0                                      |
| CENTRAL ILLINOIS LIGHT CO      | 1.28                          | 32,809.0              | 51.0                                   | 5,047.0                | 1,221.0                   | 10                   | 52.0                                      |
| CENTRAL ILLINOIS PUB SERV CO   | 4.10                          | 232,344.0             | 113.0                                  | 11,042.0               | 3,154.0                   | 15                   | 106.0                                     |
| CENTRAL IOWA POWER COOP        | 4.90                          | 7,803.0               | 3.0                                    | 261.0                  | 63.0                      | 2                    | 3.0                                       |
| CENTRAL LOUISIANA ELEC CO INC  | 0.46                          | 17,063.0              | 74.0                                   | 7,096.0                | 2,520.0                   | 9                    | 87.0                                      |
| CENTRAL MAINE POWER CO         | 0.92                          | 9,647.0               | 21.0                                   | 2,022.0                | 993.0                     | 11                   | 25.0                                      |
| CENTRAL NEBRASKA PUB P&I DIST  | 0.01                          | 1.0                   | 0.0                                    | 22.0                   | 109.0                     | 1                    | 0.0                                       |
| CENTRAL OPERATING CO           | 1.46                          | 29,245.0              | 40.0                                   | 4,182.0                | 1,106.0                   | 5                    | 38.0                                      |
| CENTRAL POWER & LIGHT CO       | 0.15                          | 12,240.0              | 168.0                                  | 16,547.0               | 3,804.0                   | 24                   | 160.0                                     |
| CENTRAL VERMONT PUB SERV CORP  | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| CHANUTE CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 3.0                    | 14.0                      | 11                   | 0.0                                       |
| CHILLICOTHE MUNICIPAL UTILS    | 6.50                          | 1,323.0               | 0.0                                    | 17.0                   | 11.0                      | 2                    | 0.0                                       |
| CINCINNATI GAS & ELECTRIC CO   | 2.52                          | 177,256.0             | 141.0                                  | 14,314.0               | 3,269.0                   | 25                   | 139.0                                     |
| CLARKSDALE CITY OF             | 0.00                          | 0.0                   | 0.0                                    | 1.0                    | 24.0                      | 6                    | 0.0                                       |
| CLAY CENTER CITY OF            | 0.00                          | 0.0                   | 0.0                                    | 16.0                   | 10.0                      | 3                    | 0.0                                       |
| CLEVELAND CITY OF              | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 160.0                     | 10                   | 0.0                                       |
| CLEVELAND ELECTRIC ILLUM CO    | 4.46                          | 312,472.0             | 140.0                                  | 13,536.0               | 3,063.0                   | 31                   | 141.0                                     |
| COFFEYVILLE CITY OF            | 0.00                          | 0.0                   | 0.0                                    | 34.0                   | 80.0                      | 13                   | 0.0                                       |
| COLDWATER BOARD OF PUBLIC UTIL | 1.29                          | 333.0                 | 1.0                                    | 20.0                   | 11.0                      | 3                    | 0.0                                       |
| COLORADO SPRINGS CITY OF       | 0.64                          | 9,089.0               | 29.0                                   | 2,704.0                | 552.0                     | 17                   | 30.0                                      |
| COLUMBIA CITY OF               | 6.31                          | 1,952.0               | 1.0                                    | 96.0                   | 74.0                      | 9                    | 1.0                                       |
| COLUMBUS CITY OF               | 1.23                          | 1,784.0               | 3.0                                    | 694.0                  | 90.0                      | 24                   | 4.0                                       |
| COLUMBUS SOUTHERN POWER CO     | 3.44                          | 169,299.0             | 98.0                                   | 9,432.0                | 2,281.0                   | 11                   | 87.0                                      |
| COMMONWEALTH EDISON CO         | 2.19                          | 273,639.0             | 250.0                                  | 32,381.0               | 10,479.0                  | 26                   | 257.0                                     |
| COMMONWEALTH EDISON CO IN INC  | 0.86                          | 9,651.0               | 23.0                                   | 2,262.0                | 614.0                     | 2                    | 21.0                                      |
| COMMONWEALTH ELECTRIC CO       | 0.33                          | 250.0                 | 2.0                                    | 151.0                  | 63.0                      | 3                    | 2.0                                       |
| CONNECTICUT LIGHT & POWER CO   | 0.86                          | 31,075.0              | 72.0                                   | 6,804.0                | 2,172.0                   | 22                   | 72.0                                      |
| CONSOLIDATED EDISON CO-NY INC  | 0.16                          | 13,298.0              | 169.0                                  | 12,020.0               | 5,628.0                   | 69                   | 178.0                                     |
| CONSUMERS POWER CO             | 1.76                          | 142,740.0             | 162.0                                  | 16,932.0               | 4,430.0                   | 23                   | 175.0                                     |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| COOP POWER ASSN                | 1.10                          | 38,294.0              | 70.0                                   | 6,020.0                | 1,012.0                   | 2                    | 65.0                                      |
| CORN BELT POWER COOP           | 5.04                          | 498.0                 | 0.0                                    | 12.0                   | 97.0                      | 5                    | 0.0                                       |
| CRAWFORDSVILLE ELEC LGT&PWR CO | 4.82                          | 1,970.0               | 1.0                                    | 46.0                   | 24.0                      | 2                    | 1.0                                       |
| CRISP COUNTY POWER COMM        | 1.27                          | 285.0                 | 0.0                                    | 5.0                    | 13.0                      | 1                    | 0.0                                       |
| CULPEPER TOWN OF               | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| DAIRYLAND POWER COOP           | 2.90                          | 57,917.0              | 40.0                                   | 3,755.0                | 962.0                     | 21                   | 40.0                                      |
| DAYTON POWER & LIGHT CO        | 2.08                          | 167,147.0             | 161.0                                  | 16,208.0               | 3,521.0                   | 33                   | 182.0                                     |
| DELMARVA POWER & LIGHT CO      | 1.33                          | 66,456.0              | 100.0                                  | 8,014.0                | 1,782.0                   | 20                   | 103.0                                     |
| DENISON CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| DENTON CITY OF                 | 0.04                          | 34.0                  | 2.0                                    | 119.0                  | 174.0                     | 5                    | 1.0                                       |
| DESERET GENERATION & TRAN COOP | 0.00                          | 0.0                   | 0.0                                    | 59.0                   | 400.0                     | 2                    | 12.0                                      |
| DETROIT CITY OF                | 0.38                          | 606.0                 | 3.0                                    | 243.0                  | 154.0                     | 3                    | 3.0                                       |
| DETROIT EDISON CO              | 1.18                          | 221,496.0             | 377.0                                  | 37,135.0               | 9,775.0                   | 107                  | 406.0                                     |
| DOVER CITY OF (DE)             | 2.01                          | 3,748.0               | 4.0                                    | 263.0                  | 151.0                     | 4                    | 4.0                                       |
| DOVER CITY OF (OH)             | 3.58                          | 3,105.0               | 2.0                                    | 62.0                   | 20.0                      | 9                    | 1.0                                       |
| DUKE POWER CO                  | 1.49                          | 190,216.0             | 256.0                                  | 27,627.0               | 7,573.0                   | 31                   | 253.0                                     |
| DUQUESNE LIGHT CO              | 1.59                          | 45,223.0              | 57.0                                   | 5,275.0                | 1,487.0                   | 21                   | 56.0                                      |
| EAST KENTUCKY POWER COOP INC   | 2.21                          | 73,274.0              | 66.0                                   | 6,357.0                | 1,310.0                   | 9                    | 69.0                                      |
| EASTON UTILITIES COMM          | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 3                    | 0.0                                       |
| EL PASO ELECTRIC CO            | 0.00                          | 2.0                   | 14.0                                   | 1,320.0                | 671.0                     | 12                   | 16.0                                      |
| ELECTRIC ENERGY INC            | 3.32                          | 108,384.0             | 65.0                                   | 6,250.0                | 1,100.0                   | 6                    | 55.0                                      |
| EMPIRE DISTRICT ELECTRIC CO    | 8.42                          | 81,681.0              | 19.0                                   | 1,729.0                | 344.0                     | 11                   | 18.0                                      |
| FAIRBURY CITY OF               | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 19.0                      | 3                    | 0.0                                       |
| FAIRFIELD CITY OF              | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 5.0                       | 1                    | 0.0                                       |
| FAIRMONT PUBLIC UTILITIES COMM | 1.82                          | 315.0                 | 0.0                                    | 9.0                    | 23.0                      | 12                   | 0.0                                       |
| FARMINGTON CITY OF             | 0.00                          | 0.0                   | 0.0                                    | 16.0                   | 32.0                      | 6                    | 0.0                                       |
| FLORIDA POWER & LIGHT CO       | 0.37                          | 34,580.0              | 186.0                                  | 18,167.0               | 9,388.0                   | 38                   | 240.0                                     |
| FLORIDA POWER CORP             | 1.30                          | 112,412.0             | 174.0                                  | 17,739.0               | 4,570.0                   | 27                   | 191.0                                     |
| FORT PIERCE UTILITIES AUTH     | 0.02                          | 17.0                  | 2.0                                    | 115.0                  | 106.0                     | 3                    | 1.0                                       |
| FREMONT CITY OF                | 0.88                          | 1,310.0               | 3.0                                    | 254.0                  | 130.0                     | 3                    | 3.0                                       |
| GAINESVILLE REGIONAL UTILITIES | 0.98                          | 9,427.0               | 19.0                                   | 1,757.0                | 420.0                     | 7                    | 18.0                                      |
| GARLAND CITY OF                | 0.01                          | 38.0                  | 7.0                                    | 709.0                  | 441.0                     | 8                    | 7.0                                       |
| GEORGIA POWER CO               | 3.00                          | 980,798.0             | 654.0                                  | 66,838.0               | 12,927.0                  | 41                   | 645.0                                     |
| GLENDALE CITY OF               | 0.04                          | 25.0                  | 1.0                                    | 126.0                  | 108.0                     | 3                    | 2.0                                       |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| GRAETTINGER CITY OF            | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| GRAND HAVEN CITY OF            | 0.32                          | 600.0                 | 4.0                                    | 340.0                  | 80.0                      | 3                    | 3.0                                       |
| GRAND ISLAND CITY OF           | 0.98                          | 1,521.0               | 3.0                                    | 260.0                  | 208.0                     | 4                    | 3.0                                       |
| GRAND RIVER DAM AUTHORITY      | 0.69                          | 11,732.0              | 34.0                                   | 3,123.0                | 1,010.0                   | 2                    | 40.0                                      |
| GREENVILLE CITY OF             | 0.53                          | 14.0                  | 0.0                                    | 29.0                   | 99.0                      | 3                    | 1.0                                       |
| GREENWOOD UTILITIES COMM       | 1.82                          | 1,078.0               | 1.0                                    | 73.0                   | 54.0                      | 18                   | 1.0                                       |
| GULF POWER CO                  | 3.59                          | 129,375.0             | 72.0                                   | 6,901.0                | 1,667.0                   | 11                   | 78.0                                      |
| GULF STATES UTILITIES CO       | 0.19                          | 19,680.0              | 209.0                                  | 18,703.0               | 6,987.0                   | 82                   | 204.0                                     |
| HAGERSTOWN CITY OF             | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 35.0                      | 12                   | 0.0                                       |
| HAMILTON CITY OF               | 1.19                          | 1,719.0               | 3.0                                    | 232.0                  | 111.0                     | 8                    | 3.0                                       |
| HASTINGS CITY OF               | 0.91                          | 1,052.0               | 2.0                                    | 157.0                  | 115.0                     | 3                    | 2.0                                       |
| HENDERSON CITY UTILITY COMM    | 4.66                          | 1,589.0               | 1.0                                    | 37.0                   | 44.0                      | 2                    | 1.0                                       |
| HIBBING PUBLIC UTILITIES COMM  | 1.24                          | 912.0                 | 1.0                                    | 42.0                   | 31.0                      | 9                    | 1.0                                       |
| HOLLAND CITY OF                | 1.27                          | 2,942.0               | 5.0                                    | 339.0                  | 62.0                      | 5                    | 4.0                                       |
| HOLYOKE GAS & ELECTRIC CO      | 0.58                          | 234.0                 | 1.0                                    | 2.0                    | 25.0                      | 12                   | 0.0                                       |
| HOLYOKE WATER POWER CO         | 2.14                          | 9,805.0               | 9.0                                    | 1,037.0                | 136.0                     | 1                    | 11.0                                      |
| HOMESTEAD CITY OF              | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| HOOSIER ENERGY R E C INC       | 1.90                          | 57,071.0              | 60.0                                   | 5,544.0                | 1,313.0                   | 4                    | 56.0                                      |
| HOUSTON LIGHTING & POWER CO    | 0.27                          | 65,769.0              | 480.0                                  | 46,318.0               | 12,307.0                  | 68                   | 475.0                                     |
| ILLINOIS POWER CO              | 4.44                          | 358,627.0             | 162.0                                  | 16,563.0               | 3,749.0                   | 59                   | 169.0                                     |
| IMPERIAL IRRIGATION DISTRICT   | 0.02                          | 44.0                  | 4.0                                    | 333.0                  | 189.0                     | 4                    | 4.0                                       |
| INDEPENDENCE CITY OF           | 4.56                          | 14,839.0              | 7.0                                    | 306.0                  | 148.0                     | 5                    | 5.0                                       |
| INDIANA MICHIGAN POWER CO      | 2.97                          | 156,911.0             | 106.0                                  | 10,479.0               | 4,196.0                   | 7                    | 103.0                                     |
| INDIANA-KENTUCKY ELECTRIC CORP | 5.61                          | 268,862.0             | 96.0                                   | 9,777.0                | 1,304.0                   | 6                    | 96.0                                      |
| INDIANAPOLIS POWER & LIGHT CO  | 3.08                          | 178,887.0             | 116.0                                  | 10,196.0               | 3,071.0                   | 61                   | 134.0                                     |
| INTERSTATE POWER CO            | 3.24                          | 46,860.0              | 29.0                                   | 2,511.0                | 762.0                     | 14                   | 29.0                                      |
| IOLA CITY OF                   | 0.00                          | 0.0                   | 0.0                                    | 8.0                    | 11.0                      | 3                    | 0.0                                       |
| IOWA ELECTRIC LIGHT & POWER CO | 3.90                          | 28,474.0              | 15.0                                   | 955.0                  | 494.0                     | 42                   | 16.0                                      |
| IOWA POWER INC                 | 1.00                          | 20,058.0              | 40.0                                   | 3,848.0                | 1,091.0                   | 6                    | 40.0                                      |
| IOWA PUBLIC SERVICE CO         | 0.94                          | 29,275.0              | 62.0                                   | 5,903.0                | 1,686.0                   | 5                    | 54.0                                      |
| IOWA SOUTHERN UTILITIES CO     | 1.79                          | 35,285.0              | 39.0                                   | 3,654.0                | 938.0                     | 5                    | 42.0                                      |
| IOWA-ILLINOIS GAS&ELECTRIC CO  | 1.36                          | 16,389.0              | 24.0                                   | 1,888.0                | 879.0                     | 10                   | 33.0                                      |
| JACKSONVILLE ELECTRIC AUTH     | 1.44                          | 17,776.0              | 25.0                                   | 2,257.0                | 3,123.0                   | 13                   | 42.0                                      |
| JAMESTOWN CITY OF              | 2.20                          | 2,920.0               | 3.0                                    | 382.0                  | 58.0                      | 8                    | 3.0                                       |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| JASPER CITY OF                 | 5.07                          | 3,514.0               | 1.0                                    | 82.0                   | 15.0                      | 1                    | 1.0                                       |
| JERSEY CENTRAL POWER&LIGHT CO  | 0.08                          | 897.0                 | 24.0                                   | 4,800.0                | 668.0                     | 31                   | 21.0                                      |
| KANSAS CITY CITY OF            | 2.19                          | 28,397.0              | 26.0                                   | 2,137.0                | 661.0                     | 6                    | 25.0                                      |
| KANSAS CITY POWER & LIGHT CO   | 2.44                          | 172,021.0             | 141.0                                  | 13,075.0               | 3,458.0                   | 19                   | 142.0                                     |
| KANSAS GAS & ELECTRIC CO       | 0.00                          | 3.0                   | 11.0                                   | 994.0                  | 961.0                     | 12                   | 8.0                                       |
| KANSAS POWER & LIGHT CO        | 0.71                          | 53,612.0              | 152.0                                  | 13,353.0               | 3,426.0                   | 16                   | 152.0                                     |
| KENTUCKY POWER CO              | 1.95                          | 41,549.0              | 43.0                                   | 4,278.0                | 1,097.0                   | 2                    | 48.0                                      |
| KENTUCKY UTILITIES CO          | 2.94                          | 171,706.0             | 117.0                                  | 10,802.0               | 3,404.0                   | 24                   | 125.0                                     |
| KEY WEST CITY OF               | 2.41                          | 5,892.0               | 5.0                                    | 350.0                  | 97.0                      | 8                    | 5.0                                       |
| KINGMAN CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| KISSIMMEE UTILITY AUTHORITY    | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| LAFAYETTE CITY OF              | 0.00                          | 0.0                   | 7.0                                    | 335.0                  | 379.0                     | 5                    | 6.0                                       |
| LAKE WORTH CITY OF             | 0.02                          | 12.0                  | 1.0                                    | 76.0                   | 67.0                      | 4                    | 1.0                                       |
| LAKELAND CITY OF               | 0.45                          | 6,235.0               | 28.0                                   | 2,616.0                | 670.0                     | 9                    | 22.0                                      |
| LAMAR CITY OF                  | 0.00                          | 0.0                   | 1.0                                    | 4.0                    | 33.0                      | 3                    | 1.0                                       |
| LANSING BOARD OF WATER & LIGHT | 1.17                          | 14,361.0              | 25.0                                   | 2,244.0                | 611.0                     | 19                   | 27.0                                      |
| LARNED CITY OF                 | 0.00                          | 0.0                   | 0.0                                    | 10.0                   | 13.0                      | 5                    | 0.0                                       |
| LAWRENCE PARK HEAT LGT&PWR CO  | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| LEA COUNTY ELECTRIC COOP INC   | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 49.0                      | 2                    | 0.0                                       |
| LITCHFIELD PUBLIC UTILITY COMM | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 3.0                       | 1                    | 0.0                                       |
| LOGANSPOUT CITY OF             | 1.85                          | 1,487.0               | 2.0                                    | 117.0                  | 43.0                      | 2                    | 1.0                                       |
| LONG ISLAND LIGHTING CO        | 1.74                          | 108,906.0             | 125.0                                  | 12,075.0               | 2,731.0                   | 15                   | 128.0                                     |
| LOS ANGELES CITY OF            | 0.01                          | 440.0                 | 66.0                                   | 6,199.0                | 5,017.0                   | 23                   | 100.0                                     |
| LOUISIANA POWER & LIGHT CO     | 0.01                          | 979.0                 | 151.0                                  | 14,041.0               | 4,697.0                   | 16                   | 134.0                                     |
| LOUISVILLE GAS & ELECTRIC CO   | 3.09                          | 130,182.0             | 84.0                                   | 8,001.0                | 3,075.0                   | 13                   | 87.0                                      |
| LOWER COLORADO RIVER AUTHORITY | 0.62                          | 32,637.0              | 106.0                                  | 10,492.0               | 2,775.0                   | 7                    | 103.0                                     |
| LUBBOCK CITY OF                | 0.00                          | 0.0                   | 7.0                                    | 566.0                  | 143.0                     | 7                    | 7.0                                       |
| LUVERNE CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 3.0                       | 1                    | 0.0                                       |
| MADISON GAS & ELECTRIC CO      | 1.78                          | 1,826.0               | 2.0                                    | 168.0                  | 436.0                     | 23                   | 2.0                                       |
| MAINE PUBLIC SERVICE CO        | 2.73                          | 11.0                  | 0.0                                    | 0.0                    | 19.0                      | 2                    | 0.0                                       |
| MANITOWOC CITY OF              | 2.29                          | 2,393.0               | 2.0                                    | 39.0                   | 79.0                      | 25                   | 3.0                                       |
| MARQUETTE CITY OF              | 0.58                          | 929.0                 | 3.0                                    | 234.0                  | 77.0                      | 3                    | 3.0                                       |
| MARSHALL CITY OF               | 5.97                          | 3,360.0               | 1.0                                    | 94.0                   | 27.0                      | 5                    | 1.0                                       |
| MARSHFIELD CITY OF             | 3.19                          | 1,959.0               | 1.0                                    | 64.0                   | 35.0                      | 5                    | 1.0                                       |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| MCPHERSON CITY OF              | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 49.0                      | 4                    | 0.0                                       |
| MEDINA ELECTRIC COOP INC       | 0.00                          | 0.0                   | 1.0                                    | 77.0                   | 66.0                      | 3                    | 1.0                                       |
| MENASHA CITY OF                | 2.05                          | 703.0                 | 1.0                                    | 44.0                   | 22.0                      | 4                    | 1.0                                       |
| METROPOLITAN EDISON CO         | 2.53                          | 28,306.0              | 22.0                                   | 2,151.0                | 652.0                     | 5                    | 24.0                                      |
| MICHIGAN SOUTH CENTRAL PWR AGY | 0.37                          | 513.0                 | 3.0                                    | 219.0                  | 55.0                      | 1                    | 3.0                                       |
| MIDWEST ENERGY INC             | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 62.0                      | 9                    | 0.0                                       |
| MINDEN CITY OF                 | 0.03                          | 13.0                  | 1.0                                    | 1.0                    | 25.0                      | 2                    | 0.0                                       |
| MINNESOTA POWER & LIGHT CO     | 0.82                          | 22,415.0              | 55.0                                   | 5,478.0                | 1,311.0                   | 10                   | 54.0                                      |
| MINNKOTA POWER COOP INC        | 1.29                          | 29,654.0              | 46.0                                   | 4,021.0                | 734.0                     | 4                    | 46.0                                      |
| MISSISSIPPI POWER & LIGHT CO   | 0.02                          | 588.0                 | 50.0                                   | 4,479.0                | 2,733.0                   | 10                   | 42.0                                      |
| MISSISSIPPI POWER CO           | 2.19                          | 89,757.0              | 82.0                                   | 7,968.0                | 2,160.0                   | 12                   | 90.0                                      |
| MONONGAHELA POWER CO           | 2.91                          | 398,008.0             | 274.0                                  | 27,380.0               | 5,173.0                   | 14                   | 279.0                                     |
| MONTANA POWER CO               | 0.33                          | 14,870.0              | 91.0                                   | 8,341.0                | 2,533.0                   | 6                    | 119.0                                     |
| MONTANA-DAKOTA UTILITIES CO    | 1.30                          | 23,128.0              | 36.0                                   | 3,018.0                | 600.0                     | 15                   | 33.0                                      |
| MONTAUP ELECTRIC CO            | 1.67                          | 11,812.0              | 14.0                                   | 1,313.0                | 300.0                     | 9                    | 13.0                                      |
| MOORHEAD CITY OF               | 1.77                          | 1.0                   | 0.0                                    | 20.0                   | 25.0                      | 1                    | 0.0                                       |
| MORGAN CITY CITY OF            | 0.00                          | 0.0                   | 0.0                                    | 29.0                   | 70.0                      | 4                    | 0.0                                       |
| MT PLEASANT CITY OF            | 1.87                          | 7.0                   | 0.0                                    | 0.0                    | 11.0                      | 4                    | 0.0                                       |
| MULVANE CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 2                    | 0.0                                       |
| MUSCATINE CITY OF              | 1.82                          | 10,703.0              | 12.0                                   | 1,121.0                | 276.0                     | 5                    | 11.0                                      |
| MUSCODA CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 2.0                       | 1                    | 0.0                                       |
| NATCHITOCHES CITY OF           | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 43.0                      | 3                    | 0.0                                       |
| NEBRASKA PUBLIC POWER DISTRICT | 0.76                          | 22,957.0              | 61.0                                   | 5,785.0                | 1,735.0                   | 21                   | 57.0                                      |
| NEVADA POWER CO                | 0.27                          | 6,530.0               | 49.0                                   | 4,559.0                | 884.0                     | 18                   | 41.0                                      |
| NEW ENGLAND POWER CO           | 1.88                          | 120,415.0             | 128.0                                  | 12,523.0               | 2,648.0                   | 17                   | 136.0                                     |
| NEW ORLEANS PUBLIC SERVICE INC | 0.00                          | 58.0                  | 30.0                                   | 2,703.0                | 1,092.0                   | 5                    | 29.0                                      |
| NEW ULM PUBLIC UTILITIES COMM  | 2.22                          | 1,464.0               | 1.0                                    | 73.0                   | 21.0                      | 3                    | 1.0                                       |
| NEW YORK STATE ELEC & GAS CORP | 1.69                          | 81,247.0              | 96.0                                   | 10,860.0               | 1,429.0                   | 20                   | 89.0                                      |
| NIAGARA MOHAWK POWER CORP      | 1.98                          | 117,502.0             | 119.0                                  | 11,042.0               | 3,576.0                   | 20                   | 122.0                                     |
| NORTHERN INDIANA PUB SERV CO   | 2.54                          | 119,200.0             | 94.0                                   | 8,578.0                | 3,768.0                   | 17                   | 99.0                                      |
| NORTHERN STATES POWER CO       | 1.06                          | 72,529.0              | 137.0                                  | 12,532.0               | 4,284.0                   | 56                   | 142.0                                     |
| NORTHWESTERN PUBLIC SERVICE CO | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 3                    | 0.0                                       |
| OHIO EDISON CO                 | 3.51                          | 326,619.0             | 186.0                                  | 18,222.0               | 3,604.0                   | 37                   | 187.0                                     |
| OHIO POWER CO                  | 5.67                          | 877,044.0             | 310.0                                  | 32,637.0               | 6,475.0                   | 13                   | 320.0                                     |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| OHIO VALLEY ELECTRIC CORP      | 5.76                          | 222,543.0             | 77.0                                   | 7,924.0                | 1,086.0                   | 5                    | 75.0                                      |
| OKLAHOMA GAS & ELECTRIC CO     | 0.38                          | 42,947.0              | 226.0                                  | 20,964.0               | 6,159.0                   | 22                   | 219.0                                     |
| OMAHA PUBLIC POWER DISTRICT    | 1.02                          | 21,074.0              | 41.0                                   | 3,805.0                | 1,261.0                   | 10                   | 44.0                                      |
| OPELOUSAS CITY OF              | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 39.0                      | 2                    | 0.0                                       |
| ORANGE & ROCKLAND UTILS INC    | 0.14                          | 3,723.0               | 52.0                                   | 4,810.0                | 1,737.0                   | 7                    | 55.0                                      |
| ORLANDO UTILITIES COMM         | 0.24                          | 1,700.0               | 14.0                                   | 1,337.0                | 1,103.0                   | 7                    | 20.0                                      |
| ORRVILLE CITY OF               | 5.60                          | 8,850.0               | 3.0                                    | 126.0                  | 85.0                      | 11                   | 2.0                                       |
| OTTAWA CITY OF                 | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| OTTER TAIL POWER CO            | 2.37                          | 36,387.0              | 31.0                                   | 2,648.0                | 593.0                     | 4                    | 22.0                                      |
| OWATONNA CITY OF               | 0.00                          | 0.0                   | 0.0                                    | 1.0                    | 26.0                      | 2                    | 0.0                                       |
| OWENSBORO CITY OF              | 5.21                          | 36,931.0              | 14.0                                   | 1,393.0                | 416.0                     | 2                    | 16.0                                      |
| PACIFIC GAS & ELECTRIC CO      | 0.01                          | 968.0                 | 281.0                                  | 27,864.0               | 7,335.0                   | 85                   | 235.0                                     |
| PACIFICORP                     | 0.88                          | 217,498.0             | 494.0                                  | 46,016.0               | 8,305.0                   | 28                   | 454.0                                     |
| PAINESVILLE CITY OF            | 3.73                          | 2,953.0               | 2.0                                    | 99.0                   | 55.0                      | 5                    | 2.0                                       |
| PASADENA CITY OF               | 0.01                          | 12.0                  | 4.0                                    | 320.0                  | 215.0                     | 7                    | 4.0                                       |
| PEABODY CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| PELLA CITY OF                  | 3.65                          | 2,570.0               | 1.0                                    | 72.0                   | 42.0                      | 8                    | 1.0                                       |
| PENNSYLVANIA ELECTRIC CO       | 2.66                          | 505,453.0             | 381.0                                  | 38,637.0               | 6,835.0                   | 29                   | 387.0                                     |
| PENNSYLVANIA POWER & LIGHT CO  | 2.27                          | 328,875.0             | 290.0                                  | 29,122.0               | 5,699.0                   | 27                   | 289.0                                     |
| PENNSYLVANIA POWER CO          | 0.72                          | 58,453.0              | 163.0                                  | 15,781.0               | 3,166.0                   | 10                   | 162.0                                     |
| PERU CITY OF (IL)              | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 8.0                       | 1                    | 0.0                                       |
| PERU CITY OF (IN)              | 5.79                          | 1,727.0               | 1.0                                    | 39.0                   | 32.0                      | 2                    | 1.0                                       |
| PHILADELPHIA ELECTRIC CO       | 0.33                          | 9,710.0               | 59.0                                   | 4,999.0                | 2,410.0                   | 15                   | 53.0                                      |
| PIQUA CITY OF                  | 3.92                          | 5,729.0               | 3.0                                    | 125.0                  | 45.0                      | 5                    | 2.0                                       |
| PLAINS ELEC GEN&TRANS COOP INC | 0.28                          | 2,353.0               | 17.0                                   | 1,751.0                | 278.0                     | 5                    | 14.0                                      |
| PLAQUEMINE CITY OF             | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 44.0                      | 2                    | 0.0                                       |
| PLATTE RIVER POWER AUTHORITY   | 0.14                          | 1,399.0               | 21.0                                   | 1,925.0                | 285.0                     | 1                    | 20.0                                      |
| PONCA CITY CITY OF             | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 68.0                      | 2                    | 0.0                                       |
| PORTLAND GENERAL ELECTRIC CO   | 0.80                          | 2,777.0               | 7.0                                    | 641.0                  | 561.0                     | 1                    | 2.0                                       |
| POTOMAC EDISON CO              | 1.45                          | 3,273.0               | 5.0                                    | 407.0                  | 1,411.0                   | 2                    | 5.0                                       |
| POTOMAC ELECTRIC POWER CO      | 2.14                          | 177,943.0             | 166.0                                  | 16,260.0               | 4,980.0                   | 25                   | 171.0                                     |
| POWER AUTHORITY OF STATE OF NY | 0.06                          | 633.0                 | 23.0                                   | 2,098.0                | 883.0                     | 1                    | 24.0                                      |
| PRATT CITY OF                  | 0.00                          | 0.0                   | 0.0                                    | 8.0                    | 22.0                      | 3                    | 1.0                                       |
| PROVO CITY CORP                | 0.81                          | 104.0                 | 0.0                                    | 4.0                    | 8.0                       | 8                    | 0.0                                       |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| PUBLIC SERV COMM OF YAZOO CITY | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 18.0                      | 2                    | 0.0                                       |
| PUBLIC SERVICE CO OF COLORADO  | 0.73                          | 46,649.0              | 127.0                                  | 11,765.0               | 2,475.0                   | 68                   | 127.0                                     |
| PUBLIC SERVICE CO OF IN INC    | 4.17                          | 557,014.0             | 267.0                                  | 26,403.0               | 6,219.0                   | 40                   | 255.0                                     |
| PUBLIC SERVICE CO OF NH        | 2.80                          | 75,853.0              | 54.0                                   | 5,074.0                | 1,048.0                   | 8                    | 54.0                                      |
| PUBLIC SERVICE CO OF NM        | 0.61                          | 42,375.0              | 139.0                                  | 12,294.0               | 2,010.0                   | 13                   | 119.0                                     |
| PUBLIC SERVICE CO OF OKLAHOMA  | 0.40                          | 27,094.0              | 136.0                                  | 14,686.0               | 3,570.0                   | 16                   | 129.0                                     |
| PUBLIC SERVICE ELECTRIC&GAS CO | 0.87                          | 55,602.0              | 128.0                                  | 12,410.0               | 4,400.0                   | 19                   | 118.0                                     |
| PUGET SOUND POWER & LIGHT CO   | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 88.0                      | 6                    | 0.0                                       |
| RATON PUBLIC SERVICE CO        | 1.56                          | 399.0                 | 1.0                                    | 25.0                   | 11.0                      | 3                    | 1.0                                       |
| REEDY CREEK IMPROVEMENT DIST   | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 44.0                      | 1                    | 0.0                                       |
| RICHLAND CENTER CITY OF        | 3.66                          | 1,034.0               | 1.0                                    | 26.0                   | 0.0                       | 4                    | 0.0                                       |
| RICHMOND CITY OF               | 4.06                          | 10,991.0              | 5.0                                    | 473.0                  | 93.0                      | 2                    | 5.0                                       |
| ROCHELLE MUNICIPAL UTILITIES   | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 12.0                      | 2                    | 1.0                                       |
| ROCHESTER GAS & ELECTRIC CORP  | 3.23                          | 32,334.0              | 20.0                                   | 1,990.0                | 334.0                     | 35                   | 17.0                                      |
| ROCHESTER PUBLIC UTILITIES     | 2.52                          | 4,936.0               | 4.0                                    | 343.0                  | 99.0                      | 4                    | 4.0                                       |
| RUSSELL CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 2                    | 0.0                                       |
| RUSTON CITY OF                 | 0.00                          | 0.0                   | 1.0                                    | 41.0                   | 81.0                      | 3                    | 1.0                                       |
| SALT RIVER PROJ AG I & P DIST  | 0.75                          | 80,664.0              | 215.0                                  | 20,692.0               | 3,760.0                   | 16                   | 195.0                                     |
| SAN ANTONIO CITY OF            | 0.47                          | 26,455.0              | 112.0                                  | 10,630.0               | 3,476.0                   | 25                   | 113.0                                     |
| SAN DIEGO GAS & ELECTRIC CO    | 0.07                          | 1,418.0               | 44.0                                   | 3,944.0                | 1,946.0                   | 16                   | 45.0                                      |
| SAN MIGUEL ELECTRIC COOP INC   | 1.40                          | 20,325.0              | 29.0                                   | 2,534.0                | 410.0                     | 2                    | 28.0                                      |
| SAVANNAH ELECTRIC & POWER CO   | 1.50                          | 17,209.0              | 23.0                                   | 2,147.0                | 595.0                     | 8                    | 23.0                                      |
| SEATTLE CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 42                   | 0.0                                       |
| SEBRING UTILITIES COMM         | 0.00                          | 0.0                   | 0.0                                    | 3.0                    | 13.0                      | 1                    | 0.0                                       |
| SEMINOLE ELECTRIC COOP INC     | 0.51                          | 14,819.0              | 59.0                                   | 6,005.0                | 1,304.0                   | 2                    | 67.0                                      |
| SHELBY CITY OF                 | 4.95                          | 3,063.0               | 1.0                                    | 83.0                   | 38.0                      | 6                    | 1.0                                       |
| SIERRA PACIFIC POWER CO        | 0.58                          | 9,617.0               | 33.0                                   | 3,278.0                | 974.0                     | 7                    | 29.0                                      |
| SIKESTON CITY OF               | 1.07                          | 3,338.0               | 6.0                                    | 553.0                  | 261.0                     | 2                    | 9.0                                       |
| SLEEPY EYE PUBLIC UTILITY COMM | 1.50                          | 171.0                 | 0.0                                    | 4.0                    | 2.0                       | 2                    | 0.0                                       |
| SOUTH CAROLINA ELECTRIC&GAS CO | 2.10                          | 77,789.0              | 74.0                                   | 7,353.0                | 1,903.0                   | 18                   | 76.0                                      |
| SOUTH CAROLINA GENERTG CO INC  | 1.35                          | 17,901.0              | 27.0                                   | 3,058.0                | 633.0                     | 1                    | 30.0                                      |
| SOUTH CAROLINA PUB SERV AUTH   | 1.18                          | 50,528.0              | 86.0                                   | 8,365.0                | 2,425.0                   | 12                   | 90.0                                      |
| SOUTH MISSISSIPPI EL PWR ASSN  | 0.91                          | 10,610.0              | 23.0                                   | 2,190.0                | 577.0                     | 9                    | 24.0                                      |
| SOUTH TEXAS ELECTRIC COOP INC  | 0.00                          | 0.0                   | 1.0                                    | 43.0                   | 22.0                      | 1                    | 0.0                                       |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>       | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|--------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| SOUTHERN CALIFORNIA EDISON CO  | 0.15                          | 25,949.0              | 341.0                                  | 31,977.0               | 10,470.0                  | 64                   | 339.0                                     |
| SOUTHERN ILLINOIS POWER COOP   | 2.14                          | 15,181.0              | 14.0                                   | 1,250.0                | 272.0                     | 4                    | 15.0                                      |
| SOUTHERN INDIANA GAS & ELEC CO | 4.72                          | 128,966.0             | 55.0                                   | 5,013.0                | 1,268.0                   | 7                    | 57.0                                      |
| SOUTHWESTERN ELECTRIC POWER CO | 0.80                          | 73,277.0              | 184.0                                  | 17,043.0               | 4,786.0                   | 19                   | 168.0                                     |
| SOUTHWESTERN PUBLIC SERVICE CO | 0.53                          | 44,273.0              | 168.0                                  | 16,619.0               | 3,999.0                   | 18                   | 157.0                                     |
| SOYLAND POWER COOP INC         | 5.59                          | 4,162.0               | 1.0                                    | 112.0                  | 22.0                      | 1                    | 1.0                                       |
| SPRINGFIELD CITY OF (IL)       | 2.55                          | 18,807.0              | 15.0                                   | 1,280.0                | 443.0                     | 9                    | 17.0                                      |
| SPRINGFIELD CITY OF (MO)       | 3.16                          | 22,185.0              | 14.0                                   | 1,172.0                | 447.0                     | 8                    | 16.0                                      |
| SPRINGFIELD PUBLIC UTILS COMM  | 1.73                          | 6.0                   | 0.0                                    | 0.0                    | 7.0                       | 3                    | 0.0                                       |
| ST JOSEPH LIGHT & POWER CO     | 5.13                          | 6,963.0               | 3.0                                    | 91.0                   | 151.0                     | 27                   | 3.0                                       |
| ST MARYS CITY OF               | 5.58                          | 2,301.0               | 1.0                                    | 44.0                   | 19.0                      | 5                    | 1.0                                       |
| STILLWATER UTILITIES AUTHORITY | 0.00                          | 0.0                   | 0.0                                    | 5.0                    | 23.0                      | 4                    | 1.0                                       |
| SUN COMPANY                    | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 55.0                      | 1                    | 0.0                                       |
| SUNFLOWER ELECTRIC POWER CORP  | 0.27                          | 2,174.0               | 16.0                                   | 1,414.0                | 469.0                     | 5                    | 15.0                                      |
| SUPERIOR WATER LIGHT&POWER CO  | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 25.0                      | 2                    | 0.0                                       |
| TACOMA CITY OF                 | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 50.0                      | 2                    | 0.0                                       |
| TALLAHASSEE CITY OF            | 0.12                          | 694.0                 | 12.0                                   | 1,012.0                | 464.0                     | 9                    | 13.0                                      |
| TAMPA ELECTRIC CO              | 2.71                          | 198,225.0             | 146.0                                  | 14,163.0               | 3,325.0                   | 35                   | 149.0                                     |
| TAUNTON CITY OF                | 1.25                          | 1,871.0               | 3.0                                    | 220.0                  | 123.0                     | 2                    | 3.0                                       |
| TENNESSEE VALLEY AUTHORITY     | 2.96                          | 1,147,792.0           | 775.0                                  | 77,792.0               | 17,647.0                  | 63                   | 805.0                                     |
| TERREBONNE PARISH CONSOL GOV'T | 0.00                          | 0.0                   | 2.0                                    | 112.0                  | 79.0                      | 3                    | 2.0                                       |
| TEXAS MUNICIPAL POWER AGENCY   | 0.91                          | 12,474.0              | 28.0                                   | 2,278.0                | 444.0                     | 3                    | 29.0                                      |
| TEXAS UTILITIES GENERATING CO  | 0.68                          | 285,952.0             | 840.0                                  | 76,484.0               | 18,510.0                  | 63                   | 819.0                                     |
| TEXAS-NEW MEXICO POWER CO      | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 236.0                     | 7                    | 0.0                                       |
| TOLEDO EDISON CO               | 1.70                          | 36,337.0              | 43.0                                   | 4,633.0                | 947.0                     | 23                   | 43.0                                      |
| TRAVERSE CITY CITY OF          | 1.14                          | 615.0                 | 1.0                                    | 73.0                   | 32.0                      | 10                   | 1.0                                       |
| TRI-STATE G & T ASSN INC       | 0.28                          | 9,769.0               | 70.0                                   | 6,469.0                | 1,918.0                   | 7                    | 70.0                                      |
| TRINIDAD CITY OF               | 0.76                          | 70.0                  | 0.0                                    | 6.0                    | 8.0                       | 2                    | 0.0                                       |
| TUCSON ELECTRIC POWER CO       | 0.00                          | 1.0                   | 5.0                                    | 411.0                  | 585.0                     | 11                   | 4.0                                       |
| TWO HARBORS CITY OF            | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| U S ERDA-LOS ALAMOS AREA OFF   | 0.00                          | 0.0                   | 1.0                                    | 50.0                   | 20.0                      | 9                    | 1.0                                       |
| U S STEEL                      | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| UGI CORP                       | 1.05                          | 2,579.0               | 5.0                                    | 300.0                  | 50.0                      | 1                    | 4.0                                       |
| UNION ELECTRIC CO              | 3.59                          | 400,015.0             | 223.0                                  | 21,881.0               | 6,126.0                   | 63                   | 225.0                                     |

**Table 5 (continued)**  
**Operating Utility Summaries for Selected Variables**

| <b>Operating Utility</b>      | <b>SO2RTE<br/>(lbs/MMBtu)</b> | <b>SO2<br/>(tons)</b> | <b>TOTHT<br/>(10<sup>12</sup> Btu)</b> | <b>GENER<br/>(GWh)</b> | <b>UCAPFSST*<br/>(MW)</b> | <b>Num.<br/>Unit</b> | <b>BASE8587<br/>(10<sup>12</sup> Btu)</b> |
|-------------------------------|-------------------------------|-----------------------|--|------------------------|---------------------------|----------------------|---|
| UNITED ILLUMINATING CO        | 1.06                          | 29,258.0              | 55.0                                   | 5,563.0                | 1,247.0                   | 6                    | 57.0                                      |
| UNITED POWER ASSN             | 1.36                          | 10,783.0              | 16.0                                   | 2,815.0                | 218.0                     | 5                    | 15.0                                      |
| UPPER PENINSULA POWER CO      | 1.75                          | 3,080.0               | 4.0                                    | 191.0                  | 42.0                      | 3                    | 3.0                                       |
| UTILICORP UNITED INC          | 5.71                          | 35,663.0              | 12.0                                   | 1,174.0                | 524.0                     | 5                    | 15.0                                      |
| VERO BEACH CITY OF            | 0.15                          | 97.0                  | 1.0                                    | 101.0                  | 117.0                     | 5                    | 1.0                                       |
| VINELAND CITY OF              | 1.59                          | 2,134.0               | 3.0                                    | 177.0                  | 71.0                      | 9                    | 2.0                                       |
| VIRGINIA CITY OF              | 1.21                          | 1,357.0               | 2.0                                    | 43.0                   | 36.0                      | 23                   | 1.0                                       |
| VIRGINIA ELECTRIC & POWER CO  | 2.05                          | 215,270.0             | 210.0                                  | 20,448.0               | 6,549.0                   | 25                   | 249.0                                     |
| WALLINGFORD TOWN OF           | 0.47                          | 6.0                   | 0.0                                    | 2.0                    | 23.0                      | 9                    | 0.0                                       |
| WAMEGO CITY OF                | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 0.0                       | 1                    | 0.0                                       |
| WASHINGTON WATER POWER CO     | 0.00                          | 0.0                   | 0.0                                    | 282.0                  | 51.0                      | 1                    | 4.0                                       |
| WELLINGTON CITY OF            | 0.00                          | 0.0                   | 0.0                                    | 12.0                   | 20.0                      | 2                    | 0.0                                       |
| WEST PENN POWER CO            | 3.01                          | 195,284.0             | 130.0                                  | 13,067.0               | 2,718.0                   | 14                   | 127.0                                     |
| WEST TEXAS UTILITIES CO       | 0.01                          | 96.0                  | 37.0                                   | 3,863.0                | 1,647.0                   | 31                   | 54.0                                      |
| WESTERN FARMERS ELEC COOP INC | 0.84                          | 9,152.0               | 22.0                                   | 2,009.0                | 779.0                     | 7                    | 20.0                                      |
| WESTERN MASSACHUSETTS ELEC CO | 0.98                          | 3,355.0               | 7.0                                    | 619.0                  | 210.0                     | 3                    | 7.0                                       |
| WILLMAR MUNICIPAL UTILS COMM  | 1.65                          | 757.0                 | 1.0                                    | 41.0                   | 30.0                      | 7                    | 1.0                                       |
| WINFIELD CITY OF              | 0.00                          | 0.0                   | 0.0                                    | 0.0                    | 45.0                      | 6                    | 0.0                                       |
| WINNETKA VILLAGE OF           | 2.55                          | 984.0                 | 1.0                                    | 81.0                   | 26.0                      | 20                   | 1.0                                       |
| WISCONSIN ELECTRIC POWER CO   | 2.36                          | 179,151.0             | 152.0                                  | 14,313.0               | 3,721.0                   | 40                   | 159.0                                     |
| WISCONSIN POWER & LIGHT CO    | 2.15                          | 115,574.0             | 107.0                                  | 10,443.0               | 2,248.0                   | 18                   | 111.0                                     |
| WISCONSIN PUBLIC SERVICE CORP | 1.97                          | 34,693.0              | 35.0                                   | 3,157.0                | 880.0                     | 13                   | 39.0                                      |
| WOLVERINE PWR SUPPLY COOP INC | 2.04                          | 2,608.0               | 3.0                                    | 186.0                  | 37.0                      | 5                    | 2.0                                       |
| WYANDOTTE MUNICIPAL SERV COMM | 1.08                          | 1,497.0               | 3.0                                    | 153.0                  | 73.0                      | 10                   | 3.0                                       |
| <b>UNITED STATES</b>          | <b>1.75</b>                   | <b>16,243,354.1</b>   | <b>18,578.8</b>                        | <b>1,812,655.3</b>     | <b>474,598.0</b>          | <b>3,842</b>         | <b>18,711.5</b>                           |

NOTES: All fossil-fuel steam utility generators on-line in 1989 are included in this variable summary.



## **SECTION 4**

### **SUPPLEMENTAL DATA FILE**

Although the NADB was originally conceived as a single data file from which all allowance calculations could be made, the complexity of interpreting the CAA has resulted in the creation of an additional data file, the Supplemental Data File (SDF). As was done with the NADB 2.1 Version, the SDF corresponding to the NADBV211 was available for public comment from July 7, 1992 to September 8, 1992 (FR, 1992). Following the same procedure as that for reviewing the NADB, the SDF-related documents submitted to the two EPA dockets were reviewed by EPA and the recommendations were implemented.

The SDF for the NADBV22 (SDFV22) contains the same boiler-generator records that are in the NADBV211. It is linked to the NADB through the variable SEQ which is in both files. Including SEQ, there are 38 variables in the SDF, 30 of which are different from those in the NADB.

The SDF was created so that sufficient information would be available to calculate all basic and bonus allowances. The data included in the SDF are used to classify each utility unit so that the appropriate provision(s) of the CAA can be applied to calculate Phase 2 allowances. For complete information, see Appendix G.



## REFERENCES

- EIA, 1980-1989: Energy Information Administration, "Monthly Power Plant Report," Form EIA-759, 1980-1989.
- EIA, 1982-1989: Energy Information Administration, "Steam-Electric Plant Operation and Design Report," Form EIA-767, 1982-1989.
- EIA, 1985: Energy Information Administration, "Cost and Quality of Fuels for Electric Utility Plants, 1985," 1985.
- EIA, 1989a: Energy Information Administration, "Annual Electric Generator Report," Form EIA-860, 1989.
- EIA, 1989b: Energy Information Administration, "Annual Electric Utility Report," Form EIA-861, 1989.
- EIA, 1990a: Energy Information Administration, "Annual Electric Generator Report," Form EIA-860, 1990.
- EIA, 1990b: Energy Information Administration, "Annual Outlook for U.S. Electric Power 1990: Projections Through 2010," 1990.
- EIA, 1990c: Energy Information Administration, "Annual Nonutility Power Producers Report, Form EIA-867, 1990.
- EPA, 1985: U.S. Environmental Protection Agency, "Compilation of Air Pollutant Emission Factors," *Volume I: Stationary Point and Area Sources*, Fourth Edition, September 1985 (with updates through 1988).
- EPA, 1989: U.S. Environmental Protection Agency, "The 1985 NAPAP Emissions Inventory (Version 2): Development of the National Utility Reference File," EPA-600/7-89-013a, November 1989.
- EPA, 1993: U.S. Environmental Protection Agency, "EPA Responses to Public Comments on Proposed Allocation Rule and Notice of Availability of the NADB Version 2.1," March 1993.
- FERC, 1985-1989: Federal Energy Regulatory Commission, "Monthly Report of Cost and Quality of Fuels for Electric Plants," Form FERC-423, 1985-1989.
- FPC, 1980-1981: Federal Power Commission, "Steam Electric Plant Air and Water Quality Control Data," Form FPC-67, 1980-1981.
- FR, 1991: *Federal Register*, "Notice of Availability of the NADB Version 2.0," 56 FR 33278, July 19, 1991.

- FR, 1992: *Federal Register*, "Notice of Availability of the NADB Version 2.1," 57 FR 29939, July 7, 1992.
- FR, 1993: *Federal Register*, "Acid Rain Program Final Rules," 58 FR 3590, January 11, 1993.
- FR, 1996: *Federal Register*, "Acid Rain Program: Permits, Allowance System, Sulfur Dioxide Opt-Ins, Continuous Emission Monitoring, Excess Emissions, and Appeal Procedures," 61 FR 68340, December 27, 1996.
- FR, 1998: *Federal Register*, "Acid Rain Program: Proposed 1998 Reallocation of Allowances," 63 FR 0714, January 7, 1998.
- NERC, 1990: North American Electric Reliability Council, Generating Availability Data System, "Generating Availability Report: 1985-1989," August 1990.
- Pechan, 1991: E.H. Pechan & Associates, Inc., "The National Allowance Data Base Version 2.0: Technical Support Document," prepared for U.S. Environmental Protection Agency's Office of Atmospheric and Indoor Air Programs, June 1991.
- Pechan, 1992: E.H. Pechan & Associates, Inc., "The National Allowance Data Base Version 2.1: Technical Support Document," prepared for U.S. Environmental Protection Agency's Office of Atmospheric and Indoor Air Programs, May 1992.
- Pechan, 1993: E.H. Pechan & Associates, Inc., "The National Allowance Data Base Version 2.11: Technical Support Document," prepared for U.S. Environmental Protection Agency's Office of Atmospheric Programs, March 1993.
- PL, 1990: Public Law 101-549, 42 U.S.C. §7651a(4)(c), November 15, 1990.
- Radian, 1991: Radian Corporation, "Development of Annualized SO<sub>2</sub> Emission Conversion Factors," Contract No. 68-D0-0125, prepared for U.S. Environmental Protection Agency's Office of Atmospheric and Indoor Air Programs, June 1991.
- SAIC, 1990: Science Applications International Corporation, "Analysis of State and Federal Sulfur Dioxide Site Specific Emission Regulations for Combustion Sources," Contract No. 68-02-4397, Work Assignment 28, prepared for U.S. Environmental Protection Agency's Office of Air Quality Planning and Standards, August 1990.

**APPENDIX A**

**EPA REGIONS**



**Table A-1**  
**EPA Regions**  
**Grouped By Region**  
(48 Contiguous States and District of Columbia)

Region 1

Connecticut  
Maine  
Massachusetts  
New Hampshire  
Rhode Island  
Vermont

Region 2

New Jersey  
New York

Region 3

Delaware  
District of Columbia  
Maryland  
Pennsylvania  
Virginia  
West Virginia

Region 4

Alabama  
Florida  
Georgia  
Kentucky  
Mississippi  
North Carolina  
South Carolina  
Tennessee

Region 5

Illinois  
Indiana  
Michigan  
Minnesota  
Ohio  
Wisconsin

Region 6

Arkansas  
Louisiana  
New Mexico  
Oklahoma  
Texas

Region 7

Iowa  
Kansas  
Missouri  
Nebraska

Region 8

Colorado  
Montana  
North Dakota  
South Dakota  
Utah  
Wyoming

Region 9

Arizona  
California  
Nevada

Region 10

Idaho  
Oregon  
Washington

**Table A-2**  
**EPA Regions**  
**Grouped By State**  
(48 Contiguous States and District of Columbia)

| <u>Region</u> | <u>State</u>         | <u>Region</u> | <u>State</u>   |
|---------------|----------------------|---------------|----------------|
| 4             | Alabama              | 8             | Montana        |
| 9             | Arizona              | 7             | Nebraska       |
| 6             | Arkansas             | 9             | Nevada         |
| 9             | California           | 1             | New Hampshire  |
| 8             | Colorado             | 2             | New Jersey     |
| 1             | Connecticut          | 6             | New Mexico     |
| 3             | Delaware             | 2             | New York       |
| 3             | District of Columbia | 4             | North Carolina |
| 4             | Florida              | 8             | North Dakota   |
| 4             | Georgia              | 5             | Ohio           |
| 10            | Idaho                | 6             | Oklahoma       |
| 5             | Illinois             | 10            | Oregon         |
| 5             | Indiana              | 3             | Pennsylvania   |
| 7             | Iowa                 | 1             | Rhode Island   |
| 7             | Kansas               | 4             | South Carolina |
| 4             | Kentucky             | 8             | South Dakota   |
| 6             | Louisiana            | 4             | Tennessee      |
| 1             | Maine                | 6             | Texas          |
| 3             | Maryland             | 8             | Utah           |
| 1             | Massachusetts        | 1             | Vermont        |
| 5             | Michigan             | 3             | Virginia       |
| 5             | Minnesota            | 10            | Washington     |
| 4             | Mississippi          | 3             | West Virginia  |
| 7             | Missouri             | 5             | Wisconsin      |
|               |                      | 8             | Wyoming        |

**APPENDIX B**

**MULTI-HEADER SITUATIONS**



## **APPENDIX B**

### **MULTI-HEADER SITUATIONS**

For boilers and generators with a configuration that is a one-to-one correspondence, the data were handled in a straightforward manner. If data elements are at a plant level, all records for that plant will have those same data element values.

In situations in which there are multi-header units (boiler(s) feeding multiple generators and/or generator(s) being fed by multiple boilers), the data handling was more complex. For data that are generator based, all plant records with the same generator ID will have the same value for those data elements. This holds true for boiler based data as well, so that plant records with the same boiler ID will have the same value for those data elements.

Regardless of the type of boiler-generator correspondence, there are three variables whose value is specific to each record in the NADBV22. These are the sequence number, SEQ (field 1), the 1985 to 1987 baseline, BASE8587 (field 25), and the shared heat input, HT60SHR (field 38). The specific baseline value for each boiler-generator, for example, was obtained by apportioning the boiler based fuel data to each generator, depending upon its fractional share of the total generation (or, if that was not reported, the nameplate capacity) associated with that boiler. When Form EIA-759 plant-level data were apportioned to each generator, these data were divided equally among all of the boilers connected to a multi-headered generator.

To illustrate this more concretely, consider a hypothetical plant in which boilers 1 and 2 feed generator 5, boiler 3 feeds generators 6 and 7, and boiler 4 feeds generator 8. The following five NADB boiler-generator records for this plant are illustrated in Table B-1.

---

**Table B-1**  
**Hypothetical Multi-header Data**

| SEQ  | PNAME | BLRID | GENID | NAMEPCAP | SO2 | BASE8587  |
|------|-------|-------|-------|----------|-----|-----------|
| 9991 | Test  | 1     | 5     | 75       | 111 | 11.111111 |
| 9992 | Test  | 2     | 5     | 75       | 222 | 2.222222  |
| 9993 | Test  | 3     | 6     | 24       | 333 | 33.333333 |
| 9994 | Test  | 3     | 7     | 100      | 333 | 4.444444  |
| 9995 | Test  | 4     | 8     | 25       | 55  | .555555   |

The generator-related data (nameplate capacity, for example) would be the same for SEQs 9991 and 9992 because they have the same GENID, but it would be different for SEQs 9993 and 9994, since they have different GENIDs. Conversely, boiler-related data (such as SO<sub>2</sub> emissions) would be the same for SEQs 9993 and 9994, but different for SEQs 9991 and 9992. The 1985 to 1987 baseline data would be specific to each of the five records.

Multi-headered situations must be taken into account when aggregating data. In circumstances involving summing or averaging data, **all** the records may not have be included. Whether the data element was boiler or generator based will determine which set of unique records to include. The following two cases involving the hypothetical plant depicted above describe the aggregation of specified data:

- In order to compute the plant's total SO<sub>2</sub> emissions -- boiler based data -- it would not be appropriate to sum the five records with SEQs 9991 through 9995, since the boiler-level data for BLRID=3 appears in both the SEQ=9993 **and** SEQ=9994 records. Thus, the SO<sub>2</sub> data from the four records with SEQs 9991 through 9993 and 9995 would be totaled for the plant SO<sub>2</sub> emissions. The other non-identification boiler based variables in addition to SO<sub>2</sub> are TOTALPH1, TOTHT, SO2CATEG, SCRUBBER, FELIM85, ANNFACT, AVGPD, BLRMNONL, BLRYRONL, GAS8089, MXBS8089, RY\_ER, SO2RTE, and ANNLIM85.
- To calculate the plant's total nameplate capacity (including planned units) -- generator based data -- it would not be correct to find the sum of either all of the plant's five records or the four boilers described above. This is because the capacity data for GENID=5 occurs in both SEQ=9991 and SEQ=9992, so the plant capacity would be determined by totaling the NAMEPCAP data for the four records with SEQs 9992 through 9995. The other non-identification generator based variables in addition to NAMEPCAP are: SUMNDCAP, GENMNONL, GENYRONL, HEATRATE, GENER, FLAGMUNI, and HT60.

## **APPENDIX C**

### **DBASE III PLUS NADBV22 FILE STRUCTURE**



**Table C-1**  
**DBASE III Plus NADBV22 File Structure**  
**(File: NADBV22.DBF)**

| Field | Name     | Type | Width | Description  |
|-------|----------|------|-------|--|
| 1     | SEQ      | Num  | 4     | Boiler-generator sequence number (same as in NADBV211)   |
| 2     | STATNAM  | Char | 20    | State name   |
| 3     | PNAME    | Char | 20    | Plant name   |
| 4     | BLRID    | Char | 6     | Boiler identification code   |
| 5     | GENID    | Char | 4     | Generator identification code  |
| 6     | UTILNAME | Char | 30    | Operating utility name   |
| 7     | UCODE    | Num  | 5     | Operating utility code   |
| 8     | EPARGN   | Num  | 2     | EPA region   |
| 9     | CNTYNAME | Char | 20    | County name  |
| 10    | ORISPL   | Num  | 5     | DOE ORIS plant code  |
| 11    | TOTALPH1 | Num  | 9     | Total basic Phase 1 allowances (tons)  |
| 12    | TOTHT    | Num  | 11,6  | 1985 boiler total heat input ( $10^{12}$ Btu)  |
| 13    | SO2      | Num  | 10,2  | 1985 boiler SO <sub>2</sub> emissions (tons)   |
| 14    | SO2CATEG | Num  | 2     | Boiler SO <sub>2</sub> regulatory category (0=no information, 1=SIP, 2=NSPS D, 3=NSPS Da, 4=NSPS GG, 6=SIP for existing gas turbine, combined cycle, with auxiliary firing, 9=NSPS |
| GG    |          |      |       | for existing gas turbine, combined cycle with auxiliary firing)  |
| 15    | SCRUBBER | Num  | 1     | Boiler SO <sub>2</sub> scrubber flag (1=yes, 0=no, 9=no information)   |
| 16    | FELIM85  | Num  | 8,4   | 1985 boiler SO <sub>2</sub> emission limit (lbs/MMBtu)   |
| 17    | ANNFACT  | Num  | 4,2   | 1985 SO <sub>2</sub> emission limit annualization factor   |
| 18    | AVGPD    | Num  | 2     | 1985 SO <sub>2</sub> emission limit averaging period   |
| 19    | NAMEPCAP | Num  | 7,2   | 1989 existing and planned generator nameplate capacity (MW)  |
| 20    | SUMNDCAP | Num  | 7,2   | 1989 generator summer net dependable capability (MW)   |
| 21    | GENMNONL | Num  | 2     | Generator month on-line  |
| 22    | GENYRONL | Num  | 4     | Generator year on-line   |
| 23    | BLRMNONL | Num  | 2     | Boiler month on-line   |
| 24    | BLRYRONL | Num  | 4     | Boiler year on-line  |
| 25    | BASE8587 | Num  | 11,6  | 1985-1987 boiler-generator average total heat input, "baseline" ( $10^{12}$ Btu)   |
| 26    | OUTAGEHR | Num  | 6     | Consecutive planned and forced outage time during 1985-1987 $\geq 2,920$ hours (hours)   |
| 27    | PRIMFUEL | Num  | 1     | Primary fuel indicator based on greatest fuel heat share during 1985-1987 (1=coal>50%, 2=oil/gas)  |
| 28    | GAS8089  | Num  | 7,3   | 1980-1989 gas share (%)  |
| 29    | HEATRATE | Num  | 8,2   | 1989 generator full load heat rate (Btu/kWh)   |
| 30    | GENER    | Num  | 8,2   | 1985 generator generation (GWh)  |
| 31    | UCAPFSST | Num  | 8,2   | Total capacity of the fossil-steam units operated by the operating utility in 1989 (MW)  |
| 32    | MXBS8089 | Num  | 11,6  | Maximum of the average heat inputs for any combination of three consecutive years from 1980-1989 for selected units ( $10^{12}$ Btu)   |
| 33    | RY_ER    | Num  | 8,4   | Representative year SO <sub>2</sub> emission rate (lbs/MMBtu)  |
| 34    | FLAGMUNI | Num  | 1     | Municipally operated flag (1=yes, 0=no)  |
| 35    | SO2RTE   | Num  | 8,4   | 1985 boiler SO <sub>2</sub> emission rate (lbs/MMBtu)  |
| 36    | ANNLIM85 | Num  | 8,4   | 1985 annualized boiler SO <sub>2</sub> emission limit (lbs/MMBtu)  |
| 37    | HT60     | Num  | 11,6  | Generator heat input at 60 percent capacity ( $10^{12}$ Btu)   |
| 38    | HT60SHR  | Num  | 11,6  | Boiler-generator share of generator heat input at 60 percent capacity ( $10^{12}$ Btu)   |



## **APPENDIX D**

### **CALCULATIONS FOR TOTHT, SO<sub>2</sub>, AND SO<sub>2</sub>RTE**



## APPENDIX D

### CALCULATIONS FOR TOTHT, SO<sub>2</sub>, AND SO<sub>2</sub>RTE

The NADB 1985 SO<sub>2</sub> emission rate (SO<sub>2</sub>RTE) was calculated from NADB 1985 SO<sub>2</sub> emissions (SO<sub>2</sub>) and NADB 1985 heat input (TOTHT). However, both TOTHT and SO<sub>2</sub> were most often calculated by utilities at the boiler level from quantities of fuel burned and fuel qualities such as heat and sulfur content.

The equations that EPA utilized to calculate TOTHT and SO<sub>2</sub>, in addition to SO<sub>2</sub>RTE, are described below.

#### MONTHLY TO YEARLY VALUES

Frequently, the data for fuel use and heat content (or heating value) and sulfur content (or sulfur percent) were recorded on a monthly (or daily) basis. In order to calculate on a yearly basis, these data were converted to yearly data using the following method:

- For each fuel, the total amount of fuel used for the year was calculated by adding the monthly fuel used.
- The yearly heat and sulfur contents for each fuel were determined on a fuel use weighted average. This weighted average was calculated by multiplying each month's fuel use and associated heat (or sulfur) content, and then adding these monthly values and dividing by the yearly fuel used.

#### ACTUAL 1985 YEARLY TOTAL HEAT INPUT CALCULATION

The equation used to calculate the yearly total heat input (TOTHT) is as follows:

$$\begin{array}{l} \text{TOTHT} \\ \text{(in } 10^{12} \text{ Btu)} \end{array} = \frac{\text{coal heat input} + \text{oil heat input} + \text{gas heat input}}{10^{12}} \quad (1)$$

Each fuel type heat input was calculated on a yearly basis using the following equation:

$$\begin{array}{l} \text{fuel heat} \\ \text{(in Btu)} \end{array} = (\text{fuel burned}) * (\text{wtd. av. heat content}) * (\text{conver. fact.}) \quad (2)$$

For coal, fuel burned is usually in tons and heating value is usually in Btu/lbs. Thus, the conversion factor is 2000 lbs/ton.

For oil, fuel burned is usually in barrels and heating value is usually in Btu/gal. Thus, the conversion factor is 42 gal/bbl.

For gas, fuel burned is usually in cf, and heating value is usually in Btu/cf. Thus, the conversion factor is 1.

## ACTUAL 1985 YEARLY SO<sub>2</sub> EMISSIONS CALCULATION

The equation used to calculate the yearly SO<sub>2</sub> emissions (SO<sub>2</sub>) is as follows:

$$SO_2 \text{ (in tons)} = (\text{coal } SO_2 \text{ emissions}) + (\text{oil } SO_2 \text{ emissions}) \quad (3)$$

If gas is the only fuel, the SO<sub>2</sub> gas emissions were assumed to be 0.

Each fuel type SO<sub>2</sub> emissions was calculated on a yearly basis, using the equation:

$$\text{fuel } SO_2 \text{ emissions (in tons)} = (\text{fuel use}) * (\text{yrly wtd. av. fuel sulfur \%}) * (\text{AP-42 fact.}) * \left( \frac{1 - \text{scrub. effc. \%}}{100} \right) * (\text{units conver. fact.}) \quad (4)$$

For coal, the yearly fuel burned is in tons/yr and the AP-42 factor (which accounts for the ash retention of sulfur in coal), in lbs SO<sub>2</sub>/ton coal, is by coal type:

| Coal Type              | AP-42 Factor |
|------------------------|--------------|
| bituminous, anthracite | 39 lbs/ton   |
| subbituminous          | 35           |
| lignite                | 30           |

For oil, the yearly fuel burned is in gal/yr. If it is in bbl/yr, convert using 42 gal/bbl oil. The AP-42 factor (which accounts for the oil density), in lbs SO<sub>2</sub>/thousand gal oil, is by oil type:

| Oil Type           | AP-42 Factor       |
|--------------------|--------------------|
| distillate (light) | 142.6 lbs/1000 gal |
| residual (heavy)   | 159.3 lbs/1000 gal |

For all fuel, the units conversion factor is 1 ton/2000 lbs.

## ACTUAL 1985 YEARLY SO<sub>2</sub> EMISSION RATE CALCULATION

When the SO<sub>2</sub> tons and heat input for all fuels was known, the equation for calculating the SO<sub>2</sub> emission rate (SO<sub>2</sub>RTE) is as follows:

$$SO_2 RTE \text{ (in lbs/MMBtu)} = \frac{2 * (\text{total } SO_2 \text{ emissions in tons})}{1000 * (\text{total heat input in } 10^{12} \text{ Btu})} \quad (5)$$

If the emission rate was known only for coal (from continuous emissions monitoring, for example), yet oil was also burned, the following steps were taken to calculate the emissions rate for all the fuels:

- Use the coal SO<sub>2</sub> rate (in lbs/MMBtu) and coal heat input (in 10<sup>12</sup> Btu) to "back calculate" the coal SO<sub>2</sub> emissions with the formula:

$$\text{coal SO}_2 \text{ emissions (in tons)} = \frac{1000 * (\text{SO}_2 \text{ coal em. rate}) * (\text{coal heat input})}{2} \quad (6)$$

- Calculate the oil SO<sub>2</sub> emissions using equation (4).
- Sum the coal and oil SO<sub>2</sub> emissions using equation (3).
- Calculate the coal and oil heat inputs using equation (2) and sum them using equation (1).
- Calculate overall SO<sub>2</sub> emission rate using equation (5).



## **APPENDIX E**

### **ENFORCEABLE SO<sub>2</sub> EMISSION LIMIT DETERMINATIONS**



## **APPENDIX E**

### **ENFORCEABLE SO<sub>2</sub> EMISSION LIMIT DETERMINATIONS**

The source of federally enforceable limits was the preliminary SIP limit data base developed by OAQPS. This data base (developed after a comprehensive review of all Federal, State, and local regulations affecting combustion boilers was conducted) provided Federal emission limit information for units in 1985, usually expressed in pounds of SO<sub>2</sub> per million Btu. In certain cases, these limits were not expressed in lbs/MMBtu and were converted using the factors shown in Table E-1. Limits were rounded to four decimal places.

In addition to emission limits, the data base provided the averaging periods over which these limits were enforced. (These averaging periods were essential to EPA in its determination of annual allowable 1985 SO<sub>2</sub> emission rates.) The 17 codes for the averaging period are listed in Table E-2. The data base also includes the SO<sub>2</sub> regulatory category affecting each unit. For further information, see the documentation for the SIP data base (SAIC, 1990).

Following the development of this EPA SIP limit data base, the information was reviewed by the EPA regional offices and some State agencies and utilities. Cases where limits were still in question were followed up with telephone calls to resolve any conflicts in information received.

The factor for converting pounds of sulfur to pounds of SO<sub>2</sub> is based on the molecular weights of sulfur (32) and SO<sub>2</sub> (64). Limits expressed as a percentage of sulfur or parts per million (ppm) depend on the energy content of the fuel and thus may vary, depending on several factors such as fuel heat content and atmospheric conditions. Generic conversions for these limits were based on the assumed average energy contents listed in Table E-1. In addition, limits in ppm vary with boiler operation (e.g., load and excess air); generic conversions for these limits assume, conservatively, very low excess air. The remaining factors were based on site-specific heat rates and capacities to develop conversions for Btu per hour. Standard conversion factors for residual oil are 42 gal/bbl and 7.88 lbs/gal.

A limit of 99.9 appears for units which had no federally enforceable limit in 1985 and/or no permitted limit (for new units). These were generally cases in which either the State never submitted the limits as part of its SIP and/or EPA never approved the limits; these units were therefore considered not to have a federally enforceable limit.

**Table E-1**  
**Conversion Factors**

***(Emission Limits Converted to lbs SO<sub>2</sub>/MMBtu  
by Multiplying as Below)***

| <b>Unit Measurement</b>    | <b>Plant Fuel Type</b>                                     |                               |                         |            |
|----------------------------|--|-------------------------------|-------------------------|------------|
|                            | <b>Bituminous<br/>Coal</b>                                 | <b>Subbituminous<br/>Coal</b> | <b>Lignite<br/>Coal</b> | <b>Oil</b> |
| lbs Sulfur/MMBtu           | 2.0  | 2.0                           | 2.0                     | 2.0        |
| % Sulfur in fuel           | 1.66   | 2.22                          | 2.86                    | 1.07       |
| ppm SO <sub>2</sub>        | 0.00287  | 0.00384                       | --                      | 0.00167    |
| ppm Sulfur in fuel         | --   | --                            | --                      | 0.00334    |
| tons SO <sub>2</sub> /hour | 2,000,000/(HEATRATE*SUMNDCAP*capacity factor) <sup>1</sup> |                               |                         |            |
| lbs SO <sub>2</sub> /hour  | 1,000/(HEATRATE*SUMNDCAP*capacity factor) <sup>1</sup>     |                               |                         |            |

<sup>1</sup> In these cases, if the limit was specified as the "site" limit, the summer net dependable capability for the entire plant was used; otherwise, the summer net dependable capability for the unit was used. Capacity factor was based on 1985 utilization  $[(1985 \text{ EIA total heat input in } 10^{12} \text{ Btu}) / (\text{HEATRATE} * \text{SUMNDCAP} * 8760 / 10^9)]$ . For post-1985 units, a capacity factor of 0.65 was assumed. The annualization factor for these cases was assumed to be 1.0.

***Assumed Average Energy Content Conversion***

| <b>Fuel Type</b>   | <b>Average Heat Content</b> |
|--------------------|-----------------------------|
| Bituminous Coal    | 24.0 MMBtu/ton              |
| Subbituminous Coal | 18.0 MMBtu/ton              |
| Lignite Coal       | 14.0 MMBtu/ton              |
| Residual Oil       | 6.2 MMBtu/bbl               |

**Table E-2**  
**Averaging Period Codes**

| <b>AVGPD Code</b> | <b>Definition</b>                          |
|-------------------|--|
| 0                 | oil/gas unit (no averaging period)         |
| 1                 | 1 hour                                     |
| 2                 | 2 hours                                    |
| 3                 | 3 hours                                    |
| 4                 | 1 day                                      |
| 5                 | 24 hours                                   |
| 6                 | 24 hours rolling                           |
| 7                 | 1 week                                     |
| 8                 | 30 days                                    |
| 9                 | 30 days rolling                            |
| 10                | 90 days                                    |
| 11                | 90 days rolling                            |
| 12                | 3 months                                   |
| 13                | 1 year                                     |
| 15                | not specified                              |
| 16                | at all times                               |
| 99.9              | no Federal limit for coal units or unknown |



## **APPENDIX F**

### **METHODOLOGY FOR ANNUALIZATION OF SO<sub>2</sub> EMISSION LIMITS**



## **APPENDIX F**

### **METHODOLOGY FOR ANNUALIZATION OF SO<sub>2</sub> EMISSION LIMITS**

Annualization factors are used to develop annual equivalent SO<sub>2</sub> limits as required by §402(18) of the CAA. Many emission limits are enforced on a shorter term basis (or averaging period) than annually. Because of the variability of sulfur in coal and, in some cases, scrubber performance, meeting a particular limit with an averaging period of less than a year and at a specified statutory emissions level would require a lower annual average SO<sub>2</sub> emission rate (or annual equivalent SO<sub>2</sub> limit) than would the shorter term statutory limit. EPA has selected a compliance level of one exceedance per 10 years. For example, an SO<sub>2</sub> emission limit of 1.2 lbs/MMBtu, enforced for a scrubbed unit over a 7-day averaging period, would result in an annualized SO<sub>2</sub> emission limit of 1.16 lbs/MMBtu. In general, the shorter the averaging period, the lower the annual equivalent would be. Thus, the annualization of limits was established by multiplying each federally enforceable limit by an annualization factor that is determined by the averaging period and whether unit the unit was scrubbed.

The annualization factors developed by EPA (Radian, 1991) are listed in Table F-1. The development of these factors was based on accepted EPA statistical methods using a data base containing the utility units' continuous emissions monitoring (CEM) system results. This data base is a cross-sectional representation of utility plants with units of different sizes, with or without flue gas desulfurization (FGD) systems (or scrubbers), and different coals. Factors were developed using various averaging periods and two different compliance levels.

For further information, see the annualization factors development report (Radian, 1991).

**Table F-1**  
**SO<sub>2</sub> Emission Averaging Period Codes and Annualization Factors**

| <b>AVGPD Code</b> | <b>Definition</b>                          | <b>Annualization Factor</b> |                        |
|-------------------|--|-----------------------------|------------------------|
|                   |  | <b>Scrubbed Unit</b>        | <b>Unscrubbed Unit</b> |
| 0                 | oil/gas unit                               | 1.00                        | 1.00                   |
| 1-6               | <= 1 day                                   | 0.93                        | 0.89                   |
| 7                 | 1 week                                     | 0.97                        | 0.92                   |
| 8-9               | 30 days                                    | 1.00                        | 0.96                   |
| 10-12             | 90 days                                    | 1.00                        | 1.00                   |
| 13                | 1 year                                     | 1.00                        | 1.00                   |
| 15                | not specified                              | 0.93                        | 0.89                   |
| 16                | at all times                               | 0.93                        | 0.89                   |
| 99.9              | no Federal limit for coal units or unknown | 1.00                        | 1.00                   |

**APPENDIX G**

**TECHNICAL DOCUMENTATION  
FOR THE  
SUPPLEMENTAL DATA FILE**

**Prepared for:**

**U.S. Environmental Protection Agency  
Office of Atmospheric Programs  
Acid Rain Division  
Washington, DC 20460**

**Prepared by:**

**ICF Incorporated  
Fairfax, VA 22031**

**August 1998**





## CONTENTS

|  | <u>Page</u> |
|--|-------------|
| 1. Introduction .....                            | G-3         |
| 2. Structure of the Supplemental Data File ..... | G-5         |
| Introduction .....                               | G-5         |
| Variable Types .....                             | G-5         |
| List of Fields in Supplemental Data File .....   | G-6         |
| Structure of the Supplemental Data File .....    | G-8         |
| 3. Provision Descriptions .....                  | G-9         |
| Introduction .....                               | G-9         |
| Section 404(h) .....                             | G-10        |
| Section 405(b)(3) .....                          | G-12        |
| Section 405(b)(4) .....                          | G-14        |
| Section 405(c)(3) .....                          | G-16        |
| Section 405(c)(5) .....                          | G-17        |
| Section 405(d)(5) .....                          | G-19        |
| Section 405(f)(2) .....                          | G-20        |
| Section 405(g)(4) .....                          | G-22        |
| Section 405(g)(5) .....                          | G-23        |
| Section 405(i)(1) .....                          | G-25        |
| Section 405(i)(2) .....                          | G-26        |
| Special Multi-headers .....                      | G-30        |
| 4. Examples of SDF Data .....                    | G-31        |

## TABLES

| <u>Number</u>                | <u>Page</u> |
|------------------------------|-------------|
| G-1 SDF Data Fields .....    | G-6         |
| G-2 SDF File Structure ..... | G-8         |
| G-3 Sample SDF Data .....    | G-32        |

## ABBREVIATIONS AND ACRONYMS

|                 |                                      |
|-----------------|--------------------------------------|
| BkWh            | Billion kilowatt-hours               |
| Btu             | British thermal unit                 |
| CAA             | Clean Air Act                        |
| CFR             | <i>Code of Federal Regulations</i>   |
| DOE             | U.S. Department of Energy            |
| EIA             | Energy Information Administration    |
| EPA             | U.S. Environmental Protection Agency |
| FERC            | Federal Energy Regulatory Commission |
| FGD             | Flue gas desulfurization             |
| FPC             | Federal Power Commission             |
| FR              | <i>Federal Register</i>              |
| kW              | Kilowatt                             |
| kWh             | Kilowatt-hour                        |
| lb              | Pound                                |
| MMBtu           | Million Btu                          |
| MW              | Megawatt                             |
| MWh             | Megawatt-hour                        |
| NADB            | National Allowance Data Base         |
| PC              | personal computer                    |
| SDF             | Supplemental Data File               |
| SO <sub>2</sub> | Sulfur dioxide                       |
| U.S.C.          | United States Code                   |

## SECTION 1 INTRODUCTION

The Supplemental Data File (SDF) Version 2.2 was developed by the U.S. Environmental Protection Agency (EPA) as an extension of the National Allowance Data Base (NADB) Version 2.2 to provide data that were not included in the NADB that are needed to determine Phase 2 allowance allocations as specified by the Clean Air Act (CAA).<sup>1</sup>

For more information regarding the methods of calculating Phase 2 allowances, please refer to *Technical Documentation for the 1998 Reallocation of Allowances*, prepared for the U.S. Environmental Protection Agency by ICF Incorporated.

While the NADB contains sufficient information to calculate Phase 2 allowance allocations for the vast majority of affected units, there are some provisions in the CAA that require data not contained in the NADB because they were typically only needed for a few units in order to determine eligibility or calculate sulfur dioxide (SO<sub>2</sub>) allowances.

To ensure consistency and ease of overall calculations, the SDF is structured similarly to the NADB. Accordingly, each record (or unit) in the SDF corresponds exactly to a record in the NADB. The SDF contains several data elements from the NADB Version 2.2, referred to as “identification fields,” which are included to ease the task of matching information for specific units from the two files. Like the NADB, the SDF also contains three other types of fields: data fields, calculated fields, and flag fields.

This appendix is presented in four sections, the first of which is this Introduction. Section 2 describes the four different types of variables used in the SDF and includes a summary table showing content, source, and type for each SDF data item. It also includes a table showing the dBASE III Plus format file structure of the SDF. Section 3 describes each CAA provision that requires supplemental data for allowance calculations, the specific eligibility requirements for each of the applicable provisions, and the sources of the data. Section 4 presents sample data for all the fields in the SDF.

Note that all interpretations in this document regarding definitions of statutory terms and provisions, unit eligibility, and the suitability of data sources were made by EPA and are consistent with the final acid rain rules.

---

<sup>1</sup>PL, 1990: Public Law 101-549, 42 U.S.C. §7651a(4)(c), November 15, 1990.



## SECTION 2

### STRUCTURE OF THE SUPPLEMENTAL DATA FILE

#### INTRODUCTION

As noted in Section 1 of this appendix, the SDF is structured similarly to the NADB, with one record for each boiler-generator combination. The file contains 3,842 records and 38 fields (variables). Each record in the SDF corresponds exactly to a record in the NADB, facilitating the matching of data between the two files. This section describes the structure of the SDF in three ways. First, the four SDF variable types are described, and examples of each type are given. Second, an alphabetical list of variables is presented, including the field name, a brief description, the source of the data, and the variable type. Finally, the actual dBASE III Plus PC format file structure is listed.

#### VARIABLE TYPES

There are four types of data elements or variables included in the SDF -- identification, data, calculated, and flag variables:

- ! **Identification variables** are fields from the NADB that are used to identify units in the SDF. These fields are mostly intended to ease the identification and selection of records during the allowance allocation calculations. Examples of identification variables are SEQ (boiler-generator sequence number) and PNAME (plant name).
- ! **Data variables** contain information collected by EPA's Energy Information Administration (EIA) and EPA from forms, reports, or other documentation. These also include variables that EIA calculated from data supplied by utilities on various forms. Examples include CMIN80 (1980 utility commercial/industrial sales in BkWh) and SPOP8088 (State population percentage increase, 1980 to 1988).
- ! **Calculated variables** contain information calculated from the values in other NADB and SDF fields, such as SMCOPCT (utility percent of capacity as small coal units).
- ! **Flag variables** are numeric fields with a width of 1 that hold one of two possible values. A value of 1 indicates "Yes" or "the unit/utility meets the condition," while a value of 0 indicates "No" or "the unit/utility does not meet the condition." For example, in the CONTUTIL field, a value of 1 indicates that the unit was owned by a utility that furnishes electricity, electric energy, steam, and natural gas within an area consisting of a city and one contiguous county as stipulated under §405(f)(2) of the CAA. A value of 0 indicates that the unit was not owned by such a utility.

## LIST OF FIELDS IN SUPPLEMENTAL DATA FILE

Table G-1 shows a list of fields in the SDF, listed alphabetically by field name. For each field, the field name, a brief description (including the applicable CAA provisions), the source of the data, and the type of variable are listed.

**Table G-1**  
**SDF Data Fields**

| Field    | Description  | Source  | Type           |
|----------|--|---|----------------|
| ATTAIN   | §405(b)(3): States with no nonattainment areas                 | 40 CFR Part 81, Subpart C   | Flag           |
| BIGUHARD | §405(c)(5): "System" with big, hard-to-scrub units.            | EVA Report on FGD Retrofit Cost Factors                                 | Flag           |
| BLRID    | Boiler ID  | NADB  | Identification |
| CCTGRNT  | §405(d)(5): Oil/gas unit awarded CCT grant                     | Office of Clean Coal Tech.  | Flag           |
| CMIN80   | §405(i)(2): 1980 utility Commercial/industrial sales           | Form EIA-412, FERC-1  | Data           |
| CMIN90   | §405(i)(2): 1990 utility commercial/industrial sales           | Form EIA-861  | Data           |
| CONSTYR  | §405(g)(4): Construction start year                            | Utility-Supplied Equipment and/or Construction Contracts                | Data           |
| CONTAUTH | §405(f)(2): State authority serving contiguous area            | Form EIA-767, Directory of Electric Utilities                           | Flag           |
| CONTUTIL | §405(f)(2): Utility serving contiguous area                    | Directory of Electric Utilities   | Flag           |
| G2C8587  | §405(g)(5): Units converting gas to coal, 1/85-12/87           | Inventory of Power Plants, 1985 & 1987 / Utility-Supplied Documentation | Flag           |
| GENID    | Generator ID   | NADB  | Identification |
| LIGNTPCT | §405(b)(3): Unit fuel use, 1985-1987 lignite percent share     | Calculated by EIA from Form EIA-767                                     | Data           |
| O2C8085  | §405(b)(4): Units converting oil to coal, 1/80-12/85           | Inventory of Power Plants, 1980 and 1985                                | Flag           |
| ORISPL   | DOE ORIS plant code  | NADB  | Identification |
| PNAME    | Plant name   | NADB  | Identification |
| PROHIB_O | §405(b)(4): Units issued prohibition order from burning oil    | Office of Coal and Electricity Prohibition Order Data Base              | Flag           |
| PROPIFUA | §405(g)(5): Units received proposed or final prohibition order | Office of Coal and Electricity Prohibition Order Data Base              | Flag           |
| SEQ      | Record sequence number (Link to NADB)                          | NADB  | Identification |
| SMCOPCT  | §405(c)(5): Utility percent of capacity as coal units <75 MW   | Calculated from NADB Data   | Calculated     |
| SO22000  | §405(i)(2): SO <sub>2</sub> emission rate as of 1/1/2000       | Assumed <1.2, per EPA's interpretation                                  | Data           |
| SO2LIM80 | §405(i)(2): 1980 SO <sub>2</sub> limit                         | Utility-Supplied Documentation of Regulations/Permits                   | Data           |
| SO2LIM87 | §405(g)(5): 1987 SO <sub>2</sub> limit                         | Utility-Supplied Documentation of Regulations/Permits                   | Data           |

| Field    | Description  | Source  | Type           |
|----------|--|---|----------------|
| SO2LIM90 | §405(i)(2): 1990 SO <sub>2</sub> limit                                 | Utility-Supplied Documentation of Regulations/Permits | Data           |
| SO2RTE80 | §404(h)&405(i)(2): 1980 SO <sub>2</sub> rate                           | Calculated by EIA from Form FPC-67                    | Data           |
| SO2RTE89 | §404(h): 1989 SO <sub>2</sub> rate                                     | Calculated by EIA from Form EIA-767                   | Data           |
| SO2RTE90 | §404(h)&405(i)(2): 1990 SO <sub>2</sub> rate                           | Calculated by EIA from Form EIA-767                   | Data           |
| SO2SYS80 | §405(i)(2): 1980 "System" SO <sub>2</sub> rate                         | Calculated by EIA from Form FPC-67                    | Data           |
| SO2SYS88 | §404(i)(2): 1988 "System" SO <sub>2</sub> rate                         | Calculated by EIA from Form EIA-767                   | Data           |
| SO2SYS90 | §404(h): 1990 Weighted average "system" SO <sub>2</sub> rate           | Calculated by EIA from Form EIA-767                   | Data           |
| SPECMULT | Flag: boiler feeding <25 MW generator that also feeds >25 MW generator | Calculated from NADB Data                             | Flag           |
| SPOP8088 | §405(i)(1): State population increase, 1980-1988                       | Dept. of Commerce Census Report                       | Data           |
| STATNAM  | State name   | NADB  | Identification |
| STCAP88  | §405(b)(4)&(i)(1): State gen. capacity, 1988                           | Form EIA-860  | Data           |
| UCODE    | Operating utility code from Form EIA-861                               | NADB  | Identification |
| UCUST90  | §405(c)(3): Utility's ultimate consumers, 1990                         | Form EIA-861  | Data           |
| UPCTSCRB | §405(c)(5): Utility percentage scrubbed                                | Calculated from NADB Data                             | Calculated     |
| UTILNAME | Utility name   | NADB  | Identification |
| UTILSYS  | Utility "system"   | Directory of Electric Utilities                       | Data           |

## STRUCTURE OF THE SUPPLEMENTAL DATA FILE

Table G-2 shows the structure of the SDF in dBASE III Plus PC format. For each field, the order of the field in the SDF, the field name, field type (character or numeric), width and position in the record are given. The name of the file is SDFV22.DBF. There are a number of common variables that exist both in the NADB and SDF files. The widths of data fields for these variables may not be consistent in both files.

**Table G-2**  
**SDF File Structure**  
**(File: SDFV22.DBF)**

| Field | Field Name | Type | Position | Width |
|-------|------------|------|----------|-------|
| 1     | STATNAM    | Char | 4        | 21    |
| 2     | PNAME      | Char | 25       | 21    |
| 3     | BLRID      | Char | 46       | 7     |
| 4     | GENID      | Char | 53       | 6     |
| 5     | UCODE      | Num  | 59       | 8     |
| 6     | ORISPL     | Num  | 67       | 8     |
| 7     | SEQ        | Num  | 75       | 8     |
| 8     | UTILNAME   | Char | 83       | 31    |
| 9     | SO2SYS80   | Num  | 114      | 8     |
| 10    | SO2SYS90   | Num  | 122      | 8     |
| 11    | UCUST90    | Num  | 130      | 8     |
| 12    | CMIN80     | Num  | 138      | 8     |
| 13    | CMIN90     | Num  | 146      | 8     |
| 14    | SO2SYS88   | Num  | 154      | 8     |
| 15    | STCAP88    | Num  | 162      | 8     |
| 16    | SPO8088    | Num  | 170      | 8     |
| 17    | LIGNTPCT   | Num  | 178      | 8     |
| 18    | SO2RTE80   | Num  | 186      | 8     |
| 19    | SO2RTE89   | Num  | 194      | 8     |
| 20    | SO2RTE90   | Num  | 202      | 8     |
| 21    | SO22000    | Num  | 210      | 8     |
| 22    | SMCOPCT    | Num  | 218      | 8     |
| 23    | SPECMULT   | Num  | 226      | 8     |
| 24    | UTILSYS    | Char | 234      | 31    |
| 25    | UPCTSCRB   | Num  | 265      | 8     |
| 26    | ATTAIN     | Num  | 273      | 8     |
| 27    | BIGUHARD   | Num  | 281      | 8     |
| 28    | CCTGRNT    | Num  | 289      | 8     |
| 29    | CONTUTIL   | Num  | 297      | 8     |
| 30    | CONTAUTH   | Num  | 305      | 8     |
| 31    | PROHIB_O   | Num  | 313      | 8     |
| 32    | O2C8085    | Num  | 321      | 8     |
| 33    | G2C8587    | Num  | 329      | 8     |
| 34    | PROPIFUA   | Num  | 337      | 8     |
| 35    | SO2LIM80   | Num  | 345      | 8     |
| 36    | SO2LIM90   | Num  | 353      | 8     |
| 37    | SO2LIM87   | Num  | 361      | 8     |
| 38    | CONSTYR    | Num  | 369      | 8     |

## **SECTION 3**

### **PROVISION DESCRIPTIONS**

#### **INTRODUCTION**

This section describes each provision of the CAA that requires information that is not included in the NADB to calculate Phase 2 allowance allocations. For each of the applicable provisions (or subsections in Title IV), the following information is provided:

- A summary of the provision;
- A section listing and describing the supplemental data elements required (in addition to those elements already in the NADB), including the field name and the purpose of the field (i.e., whether the data element is needed to determine eligibility for the provision or to calculate allowances under the provision);
- A table summarizing the data elements and the source of the data; and
- The methods used to determine which units satisfy the eligibility criteria.

In some cases, the number of potentially eligible units was narrowed down by taking each separate eligibility requirement for a given provision in turn, starting with the most easily identifiable requirements and moving to the more specific criteria as the number of potentially eligible units was reduced. This “winnowing” process, which was conducted in order to limit the amount of additional information required, is described more fully in each of these cases, where applicable. Note that each section of the CAA discussed in this appendix is presented on a new page for ease of reference.

## SECTION 404(h)

### *Provision Summary*

- §404(h)(1):** Phase 1 affected units with an SO<sub>2</sub> emission rate below 1.0 lb/MMBtu as of enactment, whose SO<sub>2</sub> rate declined by 60 percent or more between 1980 and enactment, and which were part of a “utility system” whose weighted average SO<sub>2</sub> emission rate as of enactment for all fossil units was less than 1.0 lb/MMBtu, may use an alternate baseline (i.e., fuel consumption at a 60 percent capacity factor) in determining their Phase 2 allowance allocations.
- §404(h)(2):** Units eligible for §404(h)(1) that choose the alternate baseline described therein must use the lesser of a 1.0 lb/MMBtu rate or their actual 1989 SO<sub>2</sub> emission rate in determining their Phase 2 allowance allocations.

### *Supplemental Data Elements Required*

- ! **SO<sub>2</sub> Emission Rate as of Enactment** -- The boiler's SO<sub>2</sub> rate as of enactment, which EPA has interpreted to mean the boiler's annual average SO<sub>2</sub> rate for 1990. This information was calculated by EIA from Form EIA-767.
- ! **1980 SO<sub>2</sub> Emission Rate** -- The boiler's annual average 1980 SO<sub>2</sub> emission rate, calculated by EIA from Form FPC-67.
- ! **Utility System Weighted Average SO<sub>2</sub> Emission Rate for All Fossil Units as of Enactment** -- The weighted average SO<sub>2</sub> rate for all fossil units owned by the utility system as of enactment, which EPA has interpreted to mean the annual weighted average SO<sub>2</sub> rate as of 1990, where the units' SO<sub>2</sub> rates were weighted by 1990 fuel consumption using the following formula:

$$\left[ \begin{array}{c} \text{Utility System's} \\ \text{Weighted Average} \\ \text{SO}_2 \text{ Rate} \end{array} \right] = \left[ \frac{\sum_{i=1}^{\# \text{ Units}} (\text{SO}_2 \text{ Rate}_i \times \text{Fuel Consumption}_i \text{ (MMBtu)})}{\sum_{i=1}^{\# \text{ Units}} \text{Fuel Consumption}_i \text{ (MMBtu)}} \right]$$

Consistent with EPA's interpretation, “utility system” has been defined as the operating utility, identified by the utility name (UTILNAME) field in the NADB. Boiler-level emissions data for these units were calculated by EIA from Form FPC-67 and Form EIA-767.

- ! **1989 SO<sub>2</sub> Emission Rate** -- The boiler's annual average 1989 SO<sub>2</sub> emission rate, calculated by EIA from Form EIA-767.

### *Summary of Supplemental Data Elements*

| <b>Data Element</b>   | <b>Field Name</b> | <b>Source</b>   | <b>Purpose of Field</b> |
|---|-------------------|---|-------------------------|
| 1980 Unit SO <sub>2</sub> emission rate (lbs/MMBtu)                     | SO2RTE80          | Calculated by EIA from Form FPC-67                        | Eligibility             |
| 1989 Unit SO <sub>2</sub> emission rate (lbs/MMBtu)                     | SO2RTE89          | Calculated by EIA from Form EIA-767                       | Calculation             |
| 1990 Unit SO <sub>2</sub> emission rate (lbs/MMBtu)                     | SO2RTE90          | Calculated by EIA from Form EIA-767                       | Eligibility             |
| 1990 Utility weighted average SO <sub>2</sub> emission rate (lbs/MMBtu) | SO2SYS90          | Calculated by EIA from SO2RTE90 and 1990 Fuel Consumption | Eligibility             |

### *Determination of Eligibility*

The following process was used to narrow down the list of potentially eligible units:

- (1) First, units must have Phase 1 allowances greater than 0, according to the NADB.
- (2) Next, units must have a 1990 boiler SO<sub>2</sub> emission rate below 1.0 lb/MMBtu.
- (3) An eligible unit's SO<sub>2</sub> emission rate also must have declined by at least 60 percent between 1980 and enactment; that is, the quotient

$$\frac{\text{Unit's Actual 1990 SO}_2 \text{ Emission Rate}}{\text{Unit's Actual 1980 SO}_2 \text{ Emission Rate}}$$

must be less than 0.4.

- (4) Finally, eligible units must be part of a utility system whose weighted average SO<sub>2</sub> emission rate as of enactment (i.e., 1990) was less than 1.0 lb/MMBtu.

## SECTION 405(b)(3)

### *Provision Summary*

**§405(b)(3):** An existing unit subject to §405(b)(1) and/or §405(b)(2), whose “annual average fuel consumption during 1985, 1986, and 1987 on a Btu basis exceeded 90 percent in the form of lignite coal which is located in a state in which, as of July 1, 1989, no county or portion of a county was designated nonattainment under §107” of the CAA, receives allowances based on the lesser of their actual or allowable 1985 SO<sub>2</sub> rate.

### *Supplemental Data Elements Required*

- !** **States With No County or Portion of a County Designated Nonattainment** -- States of which no part was listed as a nonattainment area in "Subpart C -- Section 107 Attainment Status Designations," 40 CFR, Part 81, Subpart C, §81.301 through §81.351, July 1, 1989. The states satisfying this criterion were North Dakota, Arkansas, and Mississippi.
- !** **Percentage of Average Annual Fuel Consumption in the Form of Lignite Coal** -- The percentage of average annual fuel consumption (in Btu) that was consumed in the form of lignite coal. This percentage was calculated using the following formula:

$$\frac{\sum_{i=Jan, 1985}^{Dec, 1987} \left[ \left( \begin{array}{c} \text{Lignite} \\ \text{Consumed} \\ \text{in Month}_i \end{array} \right) \times \left( \begin{array}{c} \text{Heat Content} \\ \text{of Lignite} \\ \text{in Month}_i \end{array} \right) \right]}{\sum_{i=Jan, 1985}^{Dec, 1987} \left[ \left( \begin{array}{c} \text{Total Fuel} \\ \text{Consumed} \\ \text{in Month}_i \end{array} \right) \times \left( \begin{array}{c} \text{Heat Content of} \\ \text{Fuel in Month}_i \end{array} \right) \right]} \times 100$$

Fuel consumption and heat content data were calculated by EIA from Form EIA-767.

### *Summary of Supplemental Data Elements*

| Data Element   | Field Name | Source                              | Purpose of Field |
|--|------------|-------------------------------------|------------------|
| Units in states with no nonattainment areas as of July 1, 1989 (Flag Field)                  | ATTAIN     | 40 CFR Part 81, Subpart C           | Eligibility      |
| 1985-1987 average unit-level proportion of lignite to total fuel used (Percentage, 0 to 100) | LIGNTPCT   | Calculated by EIA from Form EIA-767 | Eligibility      |

### *Determination of Eligibility*

The following process was used to narrow down the list of potentially eligible units:

- (1) First, units must be located in states that have no portion designated as nonattainment.
- (2) Next, a unit must satisfy the following criteria for §405(b)(1):
  - (a) The unit must serve a generator with a nameplate capacity 75 MW or greater, and
  - (b) The unit's actual 1985 SO<sub>2</sub> emission rate must be greater than or equal to 1.2 lbs/MMBtu.
- (3) Finally, units must have consumed more than 90 percent of their fuel in the form of lignite coal in the 1985 to 1987 period.

## SECTION 405(b)(4)

### *Provision Summary*

**§405(b)(4):** Any unit subject to §405(b)(1), “located in a State with an installed electrical generating capacity of more than 30,000,000 kW in 1988 and for which was issued a prohibition order or proposed prohibition order (from burning oil), which unit subsequently converted to coal between January 1, 1980 and December 31, 1985,” is allocated additional basic allowances based on the difference between allowances calculated under §405(b)(1) and allowances calculated based on the unit's fuel consumption at a 65 percent capacity factor, up to a maximum of 5,000 additional basic allowances.

### *Supplemental Data Elements Required*

- !** **State's Installed Electrical Generating Capacity in 1988** -- The sum of nameplate capacities reported on Form EIA-860 for all generators physically located in the state in 1988.
- !** **Issued a Prohibition Order from Burning Oil** -- Units that were issued a proposed and/or final prohibition order from burning oil, as identified by the U.S. Department of Energy (DOE) Office of Coal and Electricity.
- !** **Converted from Oil-burning to Coal-burning Between 1980 and 1985** -- Units that burned oil as their primary energy source in 1980 and then converted to coal as their primary energy source by the end of 1985. A unit's “primary energy source” is defined *for this section* as the fuel reported as such on Form EIA-860, “Annual Electric Generator Report,” according to the “Inventory of Power Plants in the United States, 1980 Annual,” DOE/EIA-0095(80), U.S. Department of Energy, 1980; and “Inventory of Power Plants in the United States: 1985,” DOE/EIA-0095(85), Energy Information Administration, 1986.

### *Summary of Supplemental Data Elements*

| Data Element  | Field Name | Source                                   | Purpose of Field |
|---|------------|--|------------------|
| 1988 state installed electric generating capacity (MW)        | STCAP88    | Form EIA-860                             | Eligibility      |
| Unit issued a prohibition order from burning oil (Flag Field) | PROHIB_O   | DOE, Office of Coal & Electricity        | Eligibility      |
| Unit converted from oil to coal, 1980-1985 (Flag Field)       | O2C8085    | Inventory of Power Plants, 1980 and 1985 | Eligibility      |

### ***Determination of Eligibility***

The following process was used to narrow down the list of potentially eligible units:

- (1) First, a unit must satisfy the following criteria for §405(b)(1):
  - (a) The unit must serve a generator with a nameplate capacity 75 MW or greater, and
  - (b) The unit's actual 1985 SO<sub>2</sub> emission rate must be greater than or equal to 1.2 lbs/MMBtu.
- (2) Next, units must be located in a state that had installed generating capacity greater than 30 million kW in 1988.
- (3) Potentially eligible units also must have been issued a prohibition order from burning oil.
- (4) Finally, units must have switched their primary fuel from oil to coal between 1980 and 1985.

## SECTION 405(c)(3)

### *Provision Summary*

**§405(c)(3):** An existing unit serving a generator “with a nameplate capacity below 75 MW and an actual 1985 emissions rate equal to, or greater than, 1.2 lbs/MMBtu which became operational on or before December 31, 1965, which is owned by a utility operating company with, as of December 31, 1989, a total fossil steam-electric generating capacity greater than 250 MW, and less than 450 MW which serves fewer than 78,000 electrical customers” as of enactment, receives basic allowances calculated based on the lesser of the unit's actual 1985 SO<sub>2</sub> rate or allowable 1985 SO<sub>2</sub> limit, times baseline, for the 2000 to 2009 period only.

### *Supplemental Data Element Required*

- ! Utility Customers as of Enactment** -- EPA interpreted this to be the number of ultimate consumers (i.e., end users, as opposed to distribution and/or transmission entities) served by each utility in 1990, according to Form EIA-861 or, for rural electrical cooperatives, the number of customers of the distribution cooperatives served by the generating cooperative.

### *Summary of Supplemental Data Element*

| Data Element                                  | Field Name | Source       | Purpose of Field |
|---|------------|--------------|------------------|
| Utility customers, 1990 (number in thousands) | UCUST90    | Form EIA-861 | Eligibility      |

### *Determination of Eligibility*

The following procedure was used to narrow down the list of potentially eligible units:

- (1) First, units must have become operational on or before December 31, 1965.
- (2) Next, they must have a nameplate capacity less than 75 MW.
- (3) Units must also have an actual 1985 SO<sub>2</sub> emission rate greater than or equal to 1.2 lbs/MMBtu.
- (4) Potentially eligible units must also be owned by a utility whose fossil steam capacity is greater than 250 MW and less than 450 MW.
- (5) Finally, units must also be owned by a utility that served fewer than 78,000 customers in 1990.

## SECTION 405(c)(5)

### *Provision Summary*

**§405(c)(5):** An existing unit serving a generator “with a nameplate capacity below 75 MW and an actual 1985 emissions rate equal to, or greater than, 1.20 lbs/MMBtu which is part of an electrical utility system which, as of the date of the enactment of the Clean Air Act Amendments of 1990, (A) has at least 20 percent of its fossil-fuel capacity controlled by flue gas desulfurization devices, (B) has more than 10 percent of its fossil-fuel capacity consisting of coal-fired units of less than 75 MW, and (C) has large units (greater than 400 MW) all of which have difficult or very difficult FGD Retrofit Cost Factors” receives basic allowances based on the unit's baseline times 2.5, for the period from 2000 to 2009 only.

### *Supplemental Data Elements Required*

- ! **Electric Utility System** -- Consistent with EPA's interpretation, an “electric utility system” has been defined *for this section* as one utility operating company and its wholly owned subsidiaries, as listed in *Electrical World's* "Directory of Electric Utilities," 98th Edition, McGraw-Hill, Inc., New York, 1990.
- ! **Electric Utility System Percent Scrubbed** -- The percent of the electric utility system's total electrical generating capacity that was scrubbed as of enactment (1990), as determined by the following equation:

$$\frac{\left[ \begin{array}{l} \text{Total Scrubbed Capacity} \\ \text{of Electric Utility System} \end{array} \right]}{\left[ \begin{array}{l} \text{Total Capacity of} \\ \text{Electric Utility System} \end{array} \right]} \times 100$$

- ! **Small Coal Units as a Percent of Fossil Capacity** -- The percent of the electric utility's fossil capacity that was made up of coal-fired units that serve generators with nameplate capacity less than 75 MW (i.e., “small”), calculated by the following equation:

$$\frac{\left[ \begin{array}{l} \text{Total Capacity of} \\ \text{Electric Utility System's} \\ \text{Small Coal Generators} \end{array} \right]}{\left[ \begin{array}{l} \text{Total Capacity of} \\ \text{Electric Utility System} \end{array} \right]} \times 100$$

- ! **System with Big, Hard-to-scrub Units** -- Electric utility systems that owned units serving generators with nameplate capacity greater than 400 MW, all of which (if unscrubbed) were rated difficult or very difficult to scrub in the report, "Evaluation of SO<sub>2</sub> Emissions and the FGD Retrofit Feasibility at the 200 Top Generating Stations," prepared for EPA by Energy Ventures Analysis, Inc., 1985.

#### *Summary of Supplemental Data Elements*

| Data Element  | Field Name | Source                                  | Purpose of Field |
|---|------------|---|------------------|
| Electric utility system as defined for §405(c)(5) (Name of System)  | UTILSYS    | Directory of Electric Utilities         | Eligibility      |
| "System" >20 percent scrubbed                                       | UPCTSCRB   | Calculated                              | Eligibility      |
| "System" with small coal units >10 percent of capacity (Flag Field) | SMCOPCT    | Calculated                              | Eligibility      |
| "System" with big, hard-to-scrub units (Flag Field)                 | BIGUHARD   | EVA Report on FGD Retrofit Cost Factors | Eligibility      |

#### *Determination of Eligibility*

The following criteria were used to narrow down the list of potentially eligible units:

- (1) First, units must serve generators with nameplate capacity less than 75 MW.
- (2) Next, units must have an actual 1985 SO<sub>2</sub> emission rate greater than or equal to 1.2 lbs/MMBtu.
- (3) Units must be part of an electric utility system that has big, hard-to-scrub units.
- (4) Potentially eligible units must also be part of an electric utility system that has more than 10 percent of its fossil capacity made up of small coal units.
- (5) Finally, units must be part of an electric utility system that was at least 20 percent scrubbed as of 1990.

## SECTION 405(d)(5)

### *Provision Summary*

**§405(d)(5):** “An oil- and gas-fired unit that has been awarded a clean coal technology demonstration grant as of January 1, 1991,” receives basic allowances based on its baseline times a 1.2 lbs/MMBtu rate.

### *Supplemental Data Element Required*

- !** **Awarded a Clean Coal Technology Grant** -- A unit that was awarded a Clean Coal Technology grant as of January 1, 1991. DOE's Office of Clean Coal Technology supplied a list of clean coal technology programs established as of January 1, 1991.

### *Summary of Supplemental Data Element*

| Data Element                                       | Field Name | Source                               | Purpose of Field |
|--|------------|--------------------------------------|------------------|
| Unit awarded a CCT grant as of 1/1/91 (Flag Field) | CCTGRNT    | DOE, Office of Clean Coal Technology | Eligibility      |

### *Determination of Eligibility*

The following criteria were used to narrow down the list of potentially eligible units:

- (1) First, the unit must be an oil/gas unit.
- (2) Next, the unit must have been awarded a Clean Coal Technology grant as of January 1, 1991.

## SECTION 405(f)(2)

### *Provision Summary*

**§405(f)(2):** Any unit “operated by a utility that furnishes electricity, electric energy, steam, and natural gas within an area consisting of a city and 1 contiguous county, and in the case of any unit owned by a state authority, the output of which unit is furnished within that same area consisting of a city and 1 contiguous county,” receives 7,000 and 2,000 basic allowances, respectively, allocated *pro rata* based on the total of basic and bonus allowances otherwise received by such units.

### *Supplemental Data Elements Required*

- ! Utility Furnishing Electricity, Gas, and Steam Within a City and One Contiguous County --** A utility that (a) sold steam in the period from 1985 to 1987 (according to Form EIA-767), (b) sold electricity and gas during this period (according to the *Electrical World's* "Directory of Electric Utilities," 98th Edition, McGraw-Hill, Inc., New York, 1990), and (c) served a city and one contiguous county. The *Directory* was consulted to determine what geographic area each eligible utility served. The only utility that satisfied all the above criteria served New York City and Westchester County.
- ! State Authority Serving the Same Area as the Utility Identified Above --** The State authority that, according to the *Directory*, served the same area as that served by a utility satisfying the criteria above; that is, New York City and Westchester County.

### *Summary of Supplemental Data Element*

| Data Element  | Field Name | Source  | Purpose of Field |
|---|------------|---|------------------|
| Utility furnishing electricity, gas, and steam within a city and one contiguous county (Flag Field) | CONTUTIL   | Form EIA-767, Directory of Electric Utilities | Eligibility      |
| State Authority serving the same area (Flag Field)  | CONTAUTH   | Directory of Electric Utilities               | Eligibility      |

### *Determination of Eligibility*

The following process was used to narrow down the list of potentially eligible units:

- (1) First, units must be owned by utilities that sold steam in the period from 1985 to 1987.
- (2) Next, the unit must be owned by utilities that also sold electricity and gas in the period from 1985 to 1987.
- (3) Potentially eligible units must also be owned by either of the following:

- (a) A utility that serves a city and one contiguous county, or
- (b) A State authority that, according to the *Directory*, serves the area identified in (3)(a) above.

## SECTION 405(g)(4)

### *Provision Summary*

**§405(g)(4):** A unit that has “commenced construction before December 31, 1990 and that commences commercial operation between January 1, 1993 and December 31, 1995” receives allowances based on the unit's fuel consumption at a 65 percent capacity factor, multiplied by the lesser of 0.3 or the unit's allowable SO<sub>2</sub> emission limit.

### *Supplemental Data Element Required*

- !** **Construction Start Year** -- The year in which a unit's construction commenced. The utilities owning units that were scheduled to commence commercial operation between January 1, 1993 and December 31, 1995 (according to the NADB) provided copies of equipment and/or construction contracts documenting the dates when they commenced construction. Under the final rule, utilities must have submitted documentation of the commencement of construction no later than December 31, 1995.

### *Summary of Supplemental Data Elements*

| Data Element                                 | Field Name | Source                           | Purpose of Field |
|--|------------|----------------------------------|------------------|
| Construction start year (Year - four digits) | CONSTYR    | Equipment/Construction Contracts | Eligibility      |

### *Determination of Eligibility*

The following process was used to narrow down the list of potentially eligible units:

- (1) First, units must be scheduled to go on-line between January 1, 1993 and December 31, 1995.
- (2) Next, units must have commenced construction on or before December 31, 1990.

**Note:** For programming purposes, units that did not commence operation between January 1, 1993 and December 31, 1995 are assigned the value “9999” for the CONSTYR field. Units that were originally scheduled to commence operation between January 1, 1993 and December 31, 1995 but that were canceled are assigned the value “0” for the CONSTYR field. For all other units, the CONSTYR field contains the actual year that construction commenced.

## SECTION 405(g)(5)

### *Provision Summary*

**§405(g)(5):** A unit that “has completed conversion from predominantly gas fired existing operation to coal fired operation between January 1, 1985 and December 31, 1987, for which there has been allocated a proposed or final prohibition order pursuant to §301(b) of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8301 *et seq.*, repealed 1987),” receives basic allowances based on fuel consumption at a 65 percent capacity factor and the lesser of 1.2 or the unit's 1987 SO<sub>2</sub> limit.

### *Supplemental Data Elements Required*

- ! Units Converting from Gas to Coal, 1985-1987** -- This includes units that converted from predominantly gas-fired operation in 1985 to coal-fired operation by the end of 1987. “Predominantly gas-fired existing operation” means *for this section* that natural gas was the fuel reported as “primary energy source” on Form EIA-860, “Annual Electric Generator Report,” according to utility-supplied documentation, or was the primary fuel reported in the “Inventory of Power Plants in the United States, 1985,” DOE/EIA-0095(85), Energy Information Administration, 1986; and “Inventory of Power Plants in the United States: 1987,” DOE/EIA-0095(87), Energy Information Administration, 1988. A similar definition was used for “coal-fired” operation.
- ! Issued a Proposed and/or Final Prohibition Order under PIFUA** -- Units that were issued a proposed or final prohibition order according to the DOE's Office of Coal and Electricity.
- ! 1987 SO<sub>2</sub> Emission Limit** -- The unit's allowable federally enforceable emission rate in 1987. In accordance with the final rule, this limit was not subject to annualization. Electric utilities with eligible units supplied information documenting the applicable federally enforceable 1987 SO<sub>2</sub> emission limit regulations and/or permits for their units.

### *Summary of Supplemental Data Elements*

| Data Element  | Field Name | Source   | Purpose of Field |
|---|------------|--|------------------|
| Units converting from gas to coal, 1985-1987 (Flag Field)                 | G2C8587    | Inventory of Power Plants, 1985 & 1987 / Utility Letters | Eligibility      |
| Units issued proposed or final prohibition order under PIFUA (Flag Field) | PROPIFUA   | DOE, Office of Coal & Electricity                        | Eligibility      |
| 1987 Unit SO <sub>2</sub> emission limit (lbs/MMBtu)                      | SO2LIM87   | Utility-Supplied Documentation of Regulations/Permits    | Calculation      |

### *Determination of Eligibility*

The following criteria were used to narrow down the list of potentially eligible units:

- (1) First, units must have been issued a “proposed or final prohibition order.”
- (2) Next, units must have used gas as their primary fuel in 1985 and then converted to using coal as their primary fuel by the end of 1987.

## SECTION 405(i)(1)

### *Provision Summary*

**§405(i)(1):** A Phase 2 affected unit “located in a State that (A) has experienced a growth in population in excess of 25 percent between 1980 and 1988 . . . and (B) had an installed electrical generating capacity of more than 30,000,000 kW in 1988” receives up to a total of 40,000 additional allowances, based on the difference between each eligible unit's baseline and its maximum fuel consumption in any consecutive 3-year period from 1980 to 1989.

### *Supplemental Data Elements Required*

- !** **State Population Increase** -- The percentage increase in the state's population between 1980 and 1988. Data concerning state-level population growth rates were taken from Table 9: Percent Change in the Resident Population of States, by Age; April 1, 1980 to July 1, 1988, *Current Population Reports, Populations, Estimates, and Projections*, Series P-25 #1044, U.S. Department of Commerce, Bureau of the Census, August 1989, as stipulated in §405(i)(1).
- !** **State's Installed Electrical Generating Capacity in 1988** -- EPA has defined this as the sum of the nameplate capacities reported on Form EIA-860 for all generators physically located in the state in 1988.

### *Summary of Supplemental Data Elements*

| Data Element  | Field Name | Source                          | Purpose of Field |
|---|------------|---------------------------------|------------------|
| State population increase, 1980-1988 (percentage, 0 to 100) | SPOP8088   | Dept. of Commerce Census Report | Eligibility      |
| 1988 State installed generating capacity (MW)               | STCAP88    | Form EIA-860                    | Eligibility      |

### *Determination of Eligibility*

The following criteria were used to narrow down the list of potentially eligible units:

- (1) First, units must be located in states that had an installed generating capacity greater than 30 million kW in 1988.
- (2) Next, eligible units must be located in a state that had at least a 25 percent increase in population between 1980 and 1988.
- (3) Finally, the units must be Phase 2 affected.

## SECTION 405(i)(2)

### *Provision Summary*

**§405(i)(2):** A unit subject to §405(b)(1), “(A) the lesser of whose actual or allowable 1980 emissions rate has declined by 50 percent or more as of the date of enactment of the Clean Air Act Amendments of 1990, (B) whose actual emissions rate is less than 1.2 lbs/MMBtu as of January 1, 2000, (C) which commenced [commercial] operation after January 1, 1970, (D) which is owned by a utility company whose combined commercial and industrial kilowatt-hour sales have increased by more than 20 percent between calendar year 1980 and the date of enactment of the Clean Air Act Amendments of 1990, and (E) whose company-wide fossil-fuel sulfur dioxide emissions rate has declined 40 percent or more from 1980 to 1988,” receives additional allowances equal to the difference between allowances calculated based on a baseline consisting of any 3 consecutive calendar years from 1980 to 1989 and allowances under §405(b)(1).

### *Supplemental Data Elements Required*

- ! **1980 SO<sub>2</sub> Emission Rate** -- The boiler's annual average 1980 SO<sub>2</sub> emission rate, calculated by EIA from Form FPC-67.
- ! **1980 SO<sub>2</sub> Emission Limit** -- The unit's allowable federally enforceable emission rate in 1980. Electric utilities with eligible units supplied information documenting the applicable federally enforceable 1980 SO<sub>2</sub> emission limitation regulations and/or permits for their units. This limit was not subject to annualization.
- ! **SO<sub>2</sub> Emission Rate as of Enactment** -- The boiler's SO<sub>2</sub> rate as of enactment, which EPA has interpreted to mean the boiler's annual average SO<sub>2</sub> emission rate in 1990. This information was calculated by EIA from Form EIA-767.
- ! **SO<sub>2</sub> Emission Limit as of Enactment** -- The unit's allowable federally enforceable emission rate as of enactment, which EPA has interpreted to mean the limit as of 1990. Electric utilities with eligible units supplied information documenting the applicable federally enforceable 1990 SO<sub>2</sub> emission limitation regulations and/or permits for their units. This limit was not subject to annualization.
- ! **2000 Actual SO<sub>2</sub> Emission Rate** -- The boiler's actual average SO<sub>2</sub> emission rate for 2000. Based on comments on the Proposed 1998 Rallocation of Allowances (63 FR 0714, January 7, 1998), this field will reflect the unit's actual SO<sub>2</sub> emission rate from 1996 through 1999, whichever year the emission rate is below 1.2 lb/mmBtu, as calculated from data submitted with the Emissions Tracking System. 1996 and 1997 data from potentially eligible units have been received and quality assured. For two of the potentially eligible units, the 1997 data were lower than 1.2 lb/mmBtu and have been entered in to this field. However, until 1998 and 1999 data are received and quality assured for the other potentially eligible units, this value will be assumed to be less than 1.2 lbs/MMBtu.

- ! **1980 Utility Commercial/Industrial Sales** -- The utility's combined commercial and industrial sales in 1980, from Form EIA-412, *Annual Report of Public Electric Utilities*, U.S. Department of Energy, Energy Information Administration, 1980; and Form FERC-1, *Annual Report of Major Electric Utilities, Licensees, and Others*, Federal Energy Regulatory Commission, 1980.
- ! **1990 Utility Commercial/Industrial Sales** -- The utility's combined commercial and industrial sales in 1990, from Form EIA-861.
- ! **1980 Utility SO<sub>2</sub> Emission Rate** -- The utility's average SO<sub>2</sub> emission rate in 1980. The utility-level SO<sub>2</sub> rates were calculated by EIA from Form FPC-67.
- ! **1988 Utility SO<sub>2</sub> Emission Rate** -- The utility's average SO<sub>2</sub> emission rate in 1988. The utility-level SO<sub>2</sub> rates were calculated by EIA from Form EIA-767.

*Summary of Supplemental Data Elements*

| Data Element   | Field Name | Source  | Purpose of Field |
|--|------------|---|------------------|
| 1980 Utility commercial/ industrial sales (BkWh)           | CMIN80     | Form EIA-412, FERC Form 1                             | Eligibility      |
| 1990 Utility commercial/ industrial sales (BkWh)           | CMIN90     | Form EIA-861  | Eligibility      |
| 1980 Unit actual SO <sub>2</sub> emission rate (lbs/MMBtu) | SO2RTE80   | Calculated by EIA from Form FPC-67                    | Eligibility      |
| 1980 Unit SO <sub>2</sub> emission limit (lbs/MMBtu)       | SO2LIM80   | Utility-Supplied Documentation of Regulations/Permits | Eligibility      |
| 1980 Utility SO <sub>2</sub> emission rate (lbs/MMBtu)     | SO2SYS80   | Calculated by EIA from Form FPC-67                    | Eligibility      |
| 1988 Utility SO <sub>2</sub> emission rate (lbs/MMBtu)     | SO2SYS88   | Calculated by EIA from Form EIA-767                   | Eligibility      |
| 1990 Unit actual SO <sub>2</sub> emission rate (lbs/MMBtu) | SO2RTE90   | Form EIA-767  | Eligibility      |
| 1990 Unit SO <sub>2</sub> emission limit (lbs/MMBtu)       | SO2LIM90   | Utility-Supplied Documentation of Regulations/Permits | Eligibility      |
| 2000 Unit actual SO <sub>2</sub> emission rate (lbs/MMBtu) | SO22000    | Currently Assumed to be < 1.2                         | Eligibility      |

### ***Determination of Eligibility***

The following process was used to narrow down the list of potentially eligible units:

- (1) First, a unit must satisfy the following criteria for §405(b)(1):
  - (a) The unit must serve a generator with nameplate capacity 75 MW or greater, and
  - (b) The unit's actual 1985 SO<sub>2</sub> emission rate must be greater than or equal to 1.2 lbs/MMBtu.
- (2) Next, units must have come on-line after January 1, 1970.
- (3) Potentially eligible units must also be owned by a utility whose combined commercial and industrial sales (MWh) increased by more than 20 percent between 1980 and 1990; that is, the quotient

$$\frac{\text{Utility's 1990 Commercial and Industrial Sales}}{\text{Utility's 1980 Commercial and Industrial Sales}}$$

must be greater than 1.2.

- (4) Units must also be owned by a utility whose SO<sub>2</sub> rate decreased by 40 percent or more from 1980 to 1988; that is, the quotient

$$\frac{\text{Utility's 1988 SO}_2 \text{ Emission Rate}}{\text{Utility's 1980 SO}_2 \text{ Emission Rate}}$$

must be less than or equal to 0.6.

- (5) If an eligible unit's 1980 SO<sub>2</sub> emission rate was less than its 1980 emission limit, then its rate must have decreased by at least 50 percent from 1980 to 1990; that is, the quotient

$$\frac{\text{Unit's Actual 1990 SO}_2 \text{ Emission Rate}}{\text{Unit's Actual 1980 SO}_2 \text{ Emission Rate}}$$

must be less than or equal to 0.5.

However, if the eligible unit's 1980 SO<sub>2</sub> emission limit was less than its 1980 emission rate, then the unit's limit must have decreased by at least 50 percent from 1980 to 1990; that is, the quotient

$$\frac{\text{Unit's 1990 SO}_2 \text{ Emission Limit}}{\text{Unit's 1980 SO}_2 \text{ Emission Limit}}$$

must be less than or equal to 0.5.

- (6) Finally, as of the year 2000, the units must have an actual SO<sub>2</sub> emission rate that is less than 1.2 lbs/MMBtu. As noted above, all units that satisfy conditions (1) through (5) were assumed by EPA to have a rate of less than 1.2 lbs/MMBtu for the year 2000.

## **SPECIAL MULTI-HEADERS**

While not called for by any specific provision, there is one additional calculated field required to identify records with boilers that serve existing generators with nameplate capacity greater than 25 MW and also serve at least one generator with nameplate capacity less than or equal to 25 MW. The addition of this field is necessary to ensure that boilers are not “partially affected” in accordance with the final rule. To ensure that all boilers are either affected or unaffected, the flag variable SPECMULT was created and set equal to 1 for these special multi-header boilers, indicating that the specified boiler-generator combination is classified as an “affected” unit, and is therefore subject to the SO<sub>2</sub> emission limit, as provided in Title IV §405.

### ***Supplemental Data Elements Required***

| <b>Data Element</b>                    | <b>Field Name</b> | <b>Source</b> |
|--|-------------------|---------------|
| Special Multi-header Unit (Flag Field) | SPECMULT          | Calculated    |

## **SECTION 4**

### **EXAMPLES OF SDF DATA**

Table G-3 is a sample of SDF data. It shows the complete data for the first five records in the file. Data for each field or variable are labeled with the appropriate field name, with the first value in each row representing the boiler-generator sequence number, SEQ. To find the value for a given variable, for instance the Barry plant's boiler 5, generator 5 record, look at the appropriate SEQ value in the first column and follow that row to the appropriate variable. For example, to find the SPOP8088 value for the state in which the Barry 5,5 boiler-generator combination is located, find the SEQ value "5" in the first column of the third group of rows, and follow that row (shaded in the table) across until you reach the SPOP8088 column (also shaded). There the value "5.40" indicates a state population growth rate of 5.4 percent during the period from 1980 to 1988 for Barry's state, Alabama. Note that a value of 0 is entered in a number of fields for the records shown, indicating either that the true value of the variable is in fact 0, or that the unit and/or its operating utility was not eligible for the applicable provision (see text for a complete description of each data element and its eligibility requirements).

**Table G-3  
Sample SDF Data**

| SEQ | STATNAM | PNAME | BLRID | GENID | UCODE | ORISPL |
|-----|---------|-------|-------|-------|-------|--------|
| 1   | ALABAMA | BARRY | 1     | 1     | 195   | 3      |
| 2   | ALABAMA | BARRY | 2     | 2     | 195   | 3      |
| 3   | ALABAMA | BARRY | 3     | 3     | 195   | 3      |
| 4   | ALABAMA | BARRY | 4     | 4     | 195   | 3      |
| 5   | ALABAMA | BARRY | 5     | 5     | 195   | 3      |

| SEQ | UTILNAME         | SO2SYS80 | SO2SYS90 | UCUST90 | CMIN80 | CMIN90 | SO2SYS88 |
|-----|------------------|----------|----------|---------|--------|--------|----------|
| 1   | ALABAMA POWER CO | 2.3135   | 2.1411   | 1127593 | 0.0000 | 0.0000 | 0.0000   |
| 2   | ALABAMA POWER CO | 2.3135   | 2.1411   | 1127593 | 0.0000 | 0.0000 | 0.0000   |
| 3   | ALABAMA POWER CO | 2.3135   | 2.1411   | 1127593 | 0.0000 | 0.0000 | 0.0000   |
| 4   | ALABAMA POWER CO | 2.3135   | 2.1411   | 1127593 | 0.0000 | 0.0000 | 0.0000   |
| 5   | ALABAMA POWER CO | 2.3135   | 2.1411   | 1127593 | 0.0000 | 0.0000 | 0.0000   |

| SEQ | STCAP88     | SPOP8088 | LIGNTPCT | SO2RTE80 | SO2RTE89 | SO2RTE90 | SO22000 | SMCOPCT | SPECMULT |
|-----|-------------|----------|----------|----------|----------|----------|---------|---------|----------|
| 1   | 19910.00000 | 5.40     | 0.00     | 0.0000   | 0.0000   | 0.0000   | 0.0000  | 2.      | 0        |
| 2   | 19910.00000 | 5.40     | 0.00     | 0.0000   | 0.0000   | 0.0000   | 0.0000  | 2.      | 0        |
| 3   | 19910.00000 | 5.40     | 0.00     | 0.0000   | 0.0000   | 0.0000   | 0.0000  | 2.      | 0        |
| 4   | 19910.00000 | 5.40     | 0.00     | 0.0000   | 0.0000   | 0.0000   | 0.0000  | 2.      | 0        |
| 5   | 19910.00000 | 5.40     | 0.00     | 0.0000   | 0.0000   | 0.0000   | 0.0000  | 2.      | 0        |

| SEQ | UTILSY           | UPCTSCRB | ATTAIN | BIGUHARD | CCTGRNT | CONTUTIL | CONTAUTH |
|-----|------------------|----------|--------|----------|---------|----------|----------|
| 1   | ALABAMA POWER CO | 0.00     | 0      | 0        | 0       | 0        | 0        |
| 2   | ALABAMA POWER CO | 0.00     | 0      | 0        | 0       | 0        | 0        |
| 3   | ALABAMA POWER CO | 0.00     | 0      | 0        | 0       | 0        | 0        |
| 4   | ALABAMA POWER CO | 0.00     | 0      | 0        | 0       | 0        | 0        |
| 5   | ALABAMA POWER CO | 0.00     | 0      | 0        | 0       | 0        | 0        |

| SEQ | PROHIB_O | O2C8085 | G2C8587 | PROPIFUA | SO2LIM80 | SO2LIM90 | SO2LIM87 | CONSTYR |
|-----|----------|---------|---------|----------|----------|----------|----------|---------|
| 1   | 0        | 0       | 0       | 0        | 0.0000   | 0.0000   | 0.0000   | 9999    |
| 2   | 0        | 0       | 0       | 0        | 0.0000   | 0.0000   | 0.0000   | 9999    |
| 3   | 0        | 0       | 0       | 0        | 0.0000   | 0.0000   | 0.0000   | 9999    |
| 4   | 0        | 0       | 0       | 0        | 0.0000   | 0.0000   | 0.0000   | 9999    |
| 5   | 0        | 0       | 0       | 0        | 0.0000   | 0.0000   | 0.0000   | 9999    |